Hawaii Department of Land and Natural Resources
Division of Forestry and Wildlife

Pittman-Robertson Wildlife Restoration Program
Game Management Program FY12-FY16

Program Narrative

W-22-G, Segments 17-21

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Hawaii Game Management Program

Introduction

Hawaii's game management program provides opportunities for recreational hunting of 15 spp. of game birds and six spp. of game mammals. However, game species currently hunted in Hawaii are not native, and game mammal species in particular may have negative impacts on sensitive native species and ecosystems. Federal law precludes the use of federal funds in a manner that jeopardizes the continued existence of listed, proposed, or candidate threatened and endangered species. Because a large percentage of Hawaii's game program is funded by the Federal Wildlife Restoration Program (Pittman Robertson or PR Program), game management decisions made for this program greatly influence management policy for public hunting areas in general.

Maintaining a recreational public hunting program that does not threaten the persistence of native species and ecosystems in Hawaii is a complex endeavor. Public hunting can provide a useful tool in controlling game mammals on public and private lands where control is needed and funds are scarce. The Hawaii Division of Forestry and Wildlife (DOFAW) public hunting program supports and facilitates hunting on public and private lands by providing a structured program that promotes and encourages participation. The program aims to direct hunting toward less ecologically sensitive areas, while at the same providing structured hunter access to more remote/pristine sites where recreational hunting can help to control game mammal populations.

Hawaii's Five Year PR Game Management Program consists of eight separate Subgrants (W-22-GC through W-29-R) and 34 different projects or segments. This program will fund projects for monitoring hunter activities and game species population status, land leases to provide additional areas for public hunting, game habitat improvement, game population management in suitable habitats through control of alien predators, facility and infrastructure development, and projects that will aid in data gathering and analysis. These and other activities are all aimed at maximizing hunter recreational opportunities and staff efficiency, within budgetary constraints, in conjunction other DOFAW mandates, and in compliance with relevant state and federal laws and regulations. Project statements and a "Schedule of Funded Projects" which provide specifics on planned management activities and expenditures are provided in the following sections.

The State of Hawaii believes that after reviewing the impacts of activities funded in this grant package, findings of "No Effect" or "Not Likely To Adversely Affect Listed Species" are warranted for the Section 7 evaluation on the use of federal funds for this program. A brief overview of the program and additional supporting information is provided below. 4

Program Overview

With an ever increasing human population, there has been a concomitant increase in demand for both consumptive (hunting) and non-consumptive (wildlife study and observation) wildlife resources. There are approximately 916,000 acres of public hunting areas in Hawaii. Appendix I contains a list of public hunting areas throughout the State and maps of their locations. Hunter checking station data collected throughout the State during FY10 indicated that public hunting areas provided nearly 9,200 hunter trips for game birds and 30,500 trips for game mammals, totaling 39,370 trips (or hunter days). Hunter trips for game birds was up nearly 25% from those reported in the previous five year plan (from FY05), and trips for game mammals nearly doubled, up 80% from FY05. Game harvest reports from public hunting area check stations indicated approximately 9,300 game birds taken (down 42% from FY05) and nearly 7,500 game mammals taken (124% increase from FY05 reports).

The most dramatic increase was a 7.5-fold increase in the number of Mouflon sheep reported taken from Hawaii Island, up from 194 in FY05 to 1470 in FY10. For game bird harvest, only turkeys and doves showed an increase, with turkey harvest up 2.7-fold from FY05 reports. Participating in game-related wildlife activities is an important recreational outlet for many of Hawaii's residents and visitors. According to the U.S. Fish and Wildlife Service 2006 National Survey of Hunting, Fishing and Wildlife-Associated Recreation, 18,000 persons hunted and spent 420,000 days hunting in Hawaii[1]. The survey also indicated that hunters spent $21,000,000 in the State for hunting-related recreation, up 40% from expenditures reported in 2001.

Legal Framework

Hawaii's resources are managed under the authority and mandates of several laws and regulations. State law authorizes and mandates the protection, conservation, development and utilization of wildlife resources of the State. Specifically, Hawaii Revised Statutes (HRS) 171-3 mandates that the Department of Land and Natural Resources shall manage and administer forests, forest reserves, wildlife, wildlife sanctuaries, game management areas, public hunting areas, Natural Area Reserves, and other functions assigned by law. HRS Section 183D-2 mandates that the Department shall manage and administer the wildlife and wildlife resources of the State which, by definition, includes both game and nongame species. Section 183D-3 further mandates that the Department shall adopt rules protecting, conserving, monitoring, propagating, and harvesting wildlife and under 183D-4 the Department is given the authority to maintain, manage, and operate game management areas, wildlife sanctuaries, and public hunting areas for these purposes. Chapter 195D, HRS, provides broad authority to the department for the management of indigenous spp. and provides protection of those spp. by prohibiting take.
Within the Department, DOFAW has been delegated the management responsibility for terrestrial wildlife and the game management component of that program.

Development of wildlife management policy in Hawaii involves a broad range of considerations. Natural resources are managed in consultation and collaboration with partners, communities, and constituents, who represent a wide variety of opinions about resource management. Legislative, congressional, and judicial decisions influence, and may even dictate, natural resource management policy. In addition, many of the statutes and rules that direct management are [1]broad in nature and, at times, conflicting.

In order to deal equitably with its varied constituencies and mandates, DOFAW has developed an open and interactive process to determine guidelines for management strategies for all lands under its jurisdiction. This process has often resulted in emotional and, at times, divisive,
debates over potential forest land use and wildlife management practices as demands among user groups increase and we attempt to integrate environmental, local community, hunting, and native Hawaiian cultural concerns. Appendix IV describes the Resource Management Guidelines as

[1] Resolution of the very large discrepancies between the USFWS National Survey numbers and hunter checking station data has been previously approached as follows. With questionnaires returned from over 1,300 Hawaii hunters in 2003, the number of hunting days estimated was 5.2 times the number of hunting days reported in check stations for that year. If this factor is applied to FY10 check station data, the result is 204,700 hunting days. When national survey results were adjusted to include only licensed hunters (10,080 in FY10), the national survey estimate was 234,100 hunter days annually, much closer than the more than 10 fold difference between state and federal raw results

they relate to game animal management and how they were used to develop and coordinate activities in this program.

Federal Assistance Section 7 Assessment

In developing these projects, precautions have been taken to evaluate potential impacts to threatened and endangered species and to incorporate measures that will protect listed species that may be affected by project activities. Hawaii currently has 384 species listed as threatened or endangered, an additional 103 proposed or candidate species under consideration for listing. (See Appendix II for a list of endangered and threatened species found on the various Islands throughout the State).
A Federal Assistance Assessment (Section 7 Evaluation Form) has been completed by the State Federal Assistance Coordinator for each project to identify potential impacts to listed species and to incorporate measures to avoid impacts. The following considerations provide a general framework for the game program and the evaluation of potential program impacts on listed species. 6

1. The majority of the activities carried out under this program are routine, ongoing and located in disturbed areas with no or very few listed species. Improvements are located to avoid impacts to listed species during construction and use.

2. A small percentage of the State's Federal Assistance PR Program is dedicated to Nongame/Endangered Species wildlife activities that directly benefit and enhance listed species.

3. Many of the Game Management Program activities indirectly benefit and enhance listed species. For example, predator control and water unit development for game birds also benefit nene in many areas. Roads, trails and facilities developed or maintained in remote areas increase opportunities for wildlife viewing and increase hunter pressure which helps control game mammal populations. Access also facilitates fire control, which benefits listed species and native species and habitats.

4. DOFAW's Resource Management Guidelines and distribution maps of listed species were used as planning tools in developing game management project activities and in assessing potential impacts to listed species in completing the State's portion of the Section 7 Assessments. The major focus of the game enhancement program utilizing Federal funds is for game birds, which involves activities that are unlikely to adversely affect listed species.

5. Program activities that might enhance game mammal populations have been purposefully designed, with specific mitigative actions identified, to avoid activities that directly affect listed species. Program activities that do enhance game mammal populations are done in a small number of "Game Production" areas (less than 10% of all hunting areas) and these projects include a commitment to identify and protect listed species in the area that are at risk from game mammals.

6. Where there is a potential for adverse impacts to listed species, DOFAW has included actions to mitigate impacts such as fencing endangered plants, creation of "No Hunting" safety zones for nene, and educational materials for hunters to increase

Budget Schedule

Hawaii Department of Land aned Natural Resources
Division of Forestry and Wildlife
GAME MANAGEMENT PROGRAM FY12-FY16
W-22-G Segments 17-21

Subgrant No.	Subgrant, Project or Job Title	Year 1 FY 12	Year 2 FY13	Year 3 FY14	Year 4 FY15	Year 5 FY16	5-YR Total FY12-16
W-22-GC	Game Coordination						
	Project 1. Game Coordination-HNL Admin Segment	$556,250	$125,000	$212,500	$212,500	$125,000	$1,231,250
	Subgrant Subtotal	$556,250	$125,000	$212,500	$212,500	$125,000	$1,231,250
W-23-GL	Game Land Acquisition						
	Project 1: Game Land Acquisition - Hawaii	$20,336	$20,336	$312,500	$218,750	$218,750	$790,672
	Subgrant Subtotal	$20,336	$20,336	$312,500	$218,750	$218,750	$790,672
W-24-GO	Game Operations and Maintenance						
	Project 1: Game Ops and Maintenance - East Hawaii	$100,000	$112,500	$112,500	$86,250	$56,250	$467,500
	Project 2: Game Ops and Maintenance - West Hawaii	$143,750	$100,000	$400,000	$225,000	$150,000	$1,018,750
	Project 3: Game Ops and Maintenance - Maui	$156,250	$83,750	$90,000	$133,750	$101,250	$565,000
	Project 4: Game Ops and Maintenance - Oahu	$118,750	$62,500	$225,000	$150,000	$187,500	$743,750
	Project 5: Game Ops and Maintenance - Kauai	$137,500	$43,750	$125,000	$93,750	$125,000	$525,000
	Subgrant Subtotal	$656,250	$402,500	$952,500	$688,750	$620,000	$3,320,000
W-25-GP	Game Population Management						
	Project 1: Game Population Management - East Hawaii	$43,750	$43,750	$43,750	$68,750	$43,750	$243,750
	Project 2: Game Population Management - West Hawaii	$50,000	$50,000	$175,000	$225,000	$175,000	$675,000
	Project 3: Game Population Management - Maui	$6,875	$1,375	$6,250	$35,000	$7,500	$57,000
	Project 4: Game Population Management - Oahu	$50,000	$68,750	$68,750	$68,750	$68,750	$325,000
	Project 5: Game Population Management - Kauai	$6,250	$6,250	$131,250	$131,250	$131,250	$406,250
	Subgrant Subtotal	$156,875	$170,125	$425,000	$528,750	$426,250	$1,707,000
W-26-GH	Game Habitat Management						
	Project 1: Game Habitat Management - East Hawaii	$37,500	$37,500	$37,500	$87,500	$37,500	$237,500
	Project 2: Game Habitat Management - West Hawaii	$25,000	$25,000	$43,750	$118,750	$43,750	$256,250
	Project 3: Game Habitat Management - Maui	$12,500	$15,000	$87,500	$107,500	$26,250	$248,750
	Project 4: Game Habitat Management - Oahu	$37,500	$50,000	$50,000	$150,000	$50,000	$337,500
	Project 5: Game Habitat Management - Kauai	$50,000	$50,000	$125,000	$70,000	$125,000	$420,000
	Subgrant Subtotal	$162,500	$177,500	$343,750	$533,750	$282,500	$1,500,000
W-27-GF	Game Facilities Construction						
	Project 1: Game Facilities Construction - East Hawaii	$62,500	$37,500	$37,500	$87,500	$37,500	$262,500
	Project 2: Game Facilities Construction - West Hawaii	$12,500	$12,500	$50,000	$56,250	$31,250	$162,500
	Project 3: Game Facilities Construction - Maui	$1,875	$10,000	$10,000	$48,750	$12,500	$83,125
	Project 4: Game Facilities Construction - Oahu	$37,500	$18,750	$25,000	$18,750	$25,000	$125,000
	Project 5: Game Facilities Construction - Kauai	$50,000	$50,000	$43,750	$43,750	$43,750	$231,250
	Subgrant Subtotal	$164,375	$128,750	$166,250	$255,000	$150,000	$864,375
W-28-GS	Game Surveys						
	Project 1. Game Mammal Surveys						
	Jbb 1: Game Mammals - East Hawaii	$30,000	$30,000	$30,000	$50,000	$30,000	$170,000
	Jbb 2: Game Mammals - West Hawaii	$43,750	$43,750	$56,250	$56,250	$56,250	$256,250
	Jbb 3: Game Mammals - Maui	$12,500	$18,750	$31,250	$56,250	$62,500	$181,250
	Jbb 4: Game Mammals - Oahu	$37,500	$37,500	$37,500	$57,500	$37,500	$207,500
	Jbb 5: Game Mammals - Kauai	$37,500	$37,500	$37,500	$37,500	$37,500	$187,500
	Project 2. Game Bird Surveys						
	Jbb 1: Game Birds - East Hawaii	$15,000	$15,000	$15,000	$35,000	$15,000	$95,000
	Jbb 2: Game Birds - West Hawaii	$25,000	$25,000	$25,000	$25,000	$25,000	$125,000
	Jbb 3: Game Birds - Maui	$37,500	$9,375	$12,500	$12,500	$13,750	$85,625
	Jbb 4: Game Birds - Oahu	$31,250	$31,250	$31,250	$31,250	$31,250	$156,250
	Jbb 5: Game Birds - Kauai	$25,000	$25,000	$25,000	$25,000	$25,000	$125,000
	Subgrant Subtotal	$295,000	$273,125	$301,250	$386,250	$333,750	$1,589,375
W-29-GR	Game Research						
	Project 3. W-29-GR-1 Game Memmal Research: Developrr of Techniques and Initial Estimation of Game Mammals at Pu'u'Wa'awa'a Forest Reserve & Pu'u Anahulu GMA	$0	$0	$151,978	$151,978	$151,978	$455,934
	Subgrant Subtotal	$0	$0	$151,978	$151,978	$151,978	$455,934
	Project 4. W-29-GR-02 Gamem Mammal Research: Tools for Sustained-Yeild Management, Hawaii Island	$56,250	$56,250	$3,750	$165,000	$0	$281,250
	Project 35. Game Mammal Research: Pig Tracking Honolulu	$0	$0	$12,500	$0	$0	$12,500
	Subtotal	$56,250	$56,250	$168,228	$164,478	$151,978	$597,184
	GAME MANAGEMENT PROGRAM GRANT TOTAL	$2,067,836	$1,353,586	$2,881,978	$3,140,728	$2,308,228	$11,752,356
	Costs By Funding Source						
	Total Cost	$2,067,836	$1,353,586	$2,881,978	$3,140,728	$2,308,228	$11,752,356
	Federal Share	$1,550,877	$1,015,190	$2,161,484	$2,355,546	$1,731,171	$8,814,267
	State Share	$516,959	$338,397	$720,495	$785,182	$577,057	$2,938,089
	Cost By County						
	East Hawaii	$288,750	$276,250	$276,250	$415,000	$220,000	$1,476,250
	West Hawaii	$300,000	$256,250	$750,000	$706,250	$481,250	$2,493,750
	Maui County	$227,500	$138,250	$237,500	$393,750	$223,750	$1,220,750
	City & County of Oahu - Oahu Branch	$312,500	$268,750	$450,000	$476,250	$400,000	$1,895,000
	Kauai County	$306,250	$212,500	$487,500	$401,250	$487,500	$1,895,000
	Admin Staff - City & County of Honolulu	$632,836	$201,586	$693,228	$595,728	$495,728	$2,619,106
	Total Cost	$2,067,836	$1,353,586	$2,894,478	$2,988,228	$2,308,228	$11,599,856

Job Descriptions

Project 1 W-22-GC-1 State of Hawaii Game Program Planning and Coordination

A. Need

Because of the complexity and volume of the program and geographic separation of project activities, overall coordination must be provided in order to adequately plan, review, administer, and monitor PR game projects. In addition, the Division has begun development of a series of district strategic game management plans to facilitate effective program implementation. Liaison is needed with the U. S. Fish and Wildlife Service, State agencies and other organizations to ensure prompt and efficient handling of project affairs. Statewide program monitoring is needed to ensure compliance with Federal Assistance standards and applicable State and Federal laws, regulations, and directives. Monitoring and response may also be needed to proposed changes in State laws and regulations which may affect State participation in the game portion of the PR program. In addition, possible changes in Division administrative rules which facilitate compliance and cooperation with program partners are continuously reviewed.

B. Objectives

- Establish and maintain a system of planning, review, record keeping, project monitoring, supervision reporting and coordination among staff and outside personnel and agencies adequate to meet the requirements for participation in and administration of the game management portion of the State's Federal Assistance in Wildlife Restoration Program.
- Complete the draft strategic game management plan for the island of Hawaii and develop the same for Maui.
- Persue site-specific game management planning for all current and proposed public hunting areas.
- Assure adequate and diversified long-term funding. The program will seek to leverage PR funds to achieve broader program implementation.

C. Expected Results and Benefits

The Game Program Planning and Coordination Project will provide staff and procedures to ensure that the State meets its responsibilities for participation in the Federal Assistance program, including long-term planning, compliance, record keeping, reporting, field staff supervision, and coordination of game Federal Assistance activities with the Service and other State and agency programs. Coordination of the game portion of the program will help ensure continued participation in the PR Federal Assistance program and thereby improve hunting and increase sport hunting opportunities, protect and enhance wildlife habitat on both public and private land, improve the integration of game management activities with other compatible or competing uses and provide information on the wise management and appropriate use of game species.

D. Approach

The Federal Assistance Coordinator will serve as the principal administrator of the Federal Assistance Wildlife Restoration program and be responsible for compiling and submitting the statewide Grant Proposal Package, annual Grant Agreements and annual progress and status reports. Branch personnel will perform planning, local compliance and coordination activities at the branch level as well as provide the coordinator with project documents, reports, recommendations to be incorporated in statewide documents and assure long-term diversified funding.

Coordination with staff or other agencies concerning PR project activities will be conducted by written or verbal communication or by attendance at meetings or conferences. The coordinator will provide training sessions for Division staff, review projects in the field throughout the State, and chair PR meetings. The coordinator will assure compliance with audit requirements, Federal Assistance standards, applicable State and Federal laws and regulations and maximize utilization of available Federal Assistance funding. The coordinator or other wildlife staff will attend annual meetings of Region 1 Federal Assistance Coordinators, twice-annual meetings of the Western Association of Fish and Wildlife Agencies (WAFWA), and other national meetings and training as needed. The coordinator will schedule and chair 1-2 statewide federal assistance meetings per year. The coordinator will conduct an annual site visit to each Branch to inspect federal assistance projects for compliance with program guidelines. During FY11, the coordinator and Branch project leaders will participate and assist in a scheduled Federal Assistance Program comprehensive audit.

A draft game management plan for Hawaii is being developed through collaboration with a public hunting advisory group, and the same is planned for Maui. The advisory group will appoint a subcommittee to serve as a working group to provide guidance and oversight during the development of the plan. Public input will allow the team to focus on areas of greatest need identified by the hunting community.

The Wildlife Program Manager is the senior wildlife staff position on the administrative staff and has been designated the Division Federal Assistance Coordinator. The Wildlife Program Manager reports to and works through the Administrator who has line authority over all forestry and wildlife programs and activities in the state through branch managers to branch wildlife staff. The Wildlife Program Manager serves in a staff support and advisory function to the Administrator and Division staff. Key personnel, organizational titles, and project functions are as follows:

Jim Cogswell	Wildlife Program Manager
Vacant (Jason Omick TA)	Game Program Coordinator
Vacant (Kanalu Sproat TA)	W. Hawaii Wildlife Manager
Kanalu Sproat	E. Hawaii Wildlife Manager
John Medeiros	Maui Wildlife Manager
Jason Misaki	Oahu Wildlife Manager
Thomas Kaiakapu	Kauai Wildlife Manager
Shane De Mattos	Maui Wildlife Biologist
Joey Mello	East Hawaii Wildlife Biologist
Lindsay Ibara	Kauai Wildlife Biologist

E. Location

The Federal Assistance Coordinator and the Game Program Coordinator are stationed at the Honolulu Office of the Division of Forestry and Wildlife. The Branch Project Leaders are stationed in the respective Branch offices of the Division of Forestry and Wildlife in Lihue, Kauai; Honolulu, Oahu; Wailuku, Maui; Hilo, Hawaii; and Kamuela, Hawaii.

Project 2 W-23-GL-1 Statewide Game Land Access and Acquisition

A. Need

The Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW/Division), manages over 1,000,000 acres of state land for wildlife-dependent recreation and conservation, and demand is growing for public hunting on these public lands. However, over half of all land in Hawaii is privately owned, and private landowners—as well as other public landowners—frequently block public access to substantial portions of the DOFAW lands that are designated for public hunting. In order to expand opportunities for public hunting and other wildlife-dependent public uses, it is imperative that DOFAW (1) sustain and optimize public use of areas that are already accessible; (2) establish public access to areas that are not accessible; and (3) acquire new land for public use. If DOFAW does not satisfy the growing demand for access to public hunting areas, and if hunting pressure is not applied across a larger landscape, then game animals will become more scarce in existing hunting areas and will cause more damage on inaccessible public and private lands. DOFAW's partnership with the hunting community to manage ungulate populations will weaken, and hunter safety and satisfaction will decline due to the lack of adequate space for hunting activities.

B. Objectives

• Extend or renew existing leases, licenses, and other access agreements:
- Extend an existing license to use the Kekaha Game Management Area, Kauai (approximately 13,000 acres) for public hunting for another fifteen year period.
- Renew an existing license to use portions of the Kipuka Ainahou Wildlife Sanctuary (approximately 11,123 acres) and Mauna Kea Forest Reserve (approximately 4,303 acres), Hawaii, for wildlife management, forest reserve, and public hunting purposes for another twenty year period.
- Continue to acquire, by annual license fee, 1,000 acres of private ranch lands on Maui, to keep them available for public hunting through September 2018.
- Continue to acquire, by annual cooperative management agreement fee, 30,000 acres of private land on Lanai, to keep them available for public hunting through February 2018.

• Create new leases, licenses, and access agreements:
- Establish perpetual access to the Kau Forest Reserve, Hawaii, over lands owned by the Hawaii Department of Agriculture.
- Establish short-term access to the Hilo Forest Reserve, Hawaii, over private lands.
- Establish a cooperative management agreement for public hunting on Kauai, on state lands owned by the Hawaii Agribusiness Development Corporation.
- Establish an agreement with Kauai County to develop and manage a segment of county roadway for perpetual access to the Lihue-Koloa Forest Reserve.

• Acquire fee title or agricultural/conservation easements for key land parcels to improve public access and enhance opportunities for public hunting, public recreation, and wildlife management.
- Establish the location of a reserved right-of-way over private land for access to the Moloaa Forest Reserve, Kauai.
- Develop management plans and regulatory compliance documents for establishing a Game Management Area on state and private land at Kanaio, Maui.
- Identify and revise statewide priorities for land acquisition.
- Obtain appraisals, boundary surveys, environmental site assessments, and title reports for selected priority acquisitions.

Project 3.W-29-GR-1 Game Mammal Research: Accurately Estimate Sheep and Goat Survival Rates, Population Demographics and Habitat Use in the Puu Waawaa Forest Reserve and Puu Anahulu GMA: West Hawaii

A. Need

The Puu Waawaa Forest Reserve (PWW FR) and the Puu Anahulu Game Management Area (PAH GMA) are actively managed for sheep and goat hunting. Currently, there is a Habitat Conservation Plan in development for these two areas that would give the State greater ability to manage game mammal populations in these areas, while protecting threatened and endangered plant and animal species found there. There is a dearth of information regarding survival rates, population demographics, and habitat use for sheep and goats in these two areas.

B. Objective

- Accurately estimate sheep and goat survival rates, population demographics, and habitat use in the Puu Waawaa Forest Reserve and the Puu Anahulu Game Management Area.

C. Expected Results and Benefits

A capture-mark-recapture analysis will be used to estimate adult survival rates for these two game species in these management areas. By incorporating this information with concurrent sheep and goat abundance estimates bag limits can be more accurately determined to improve the overall hunting experience in these areas. The geographic data collected will also improve home range and habitat use estimates.

D. Approach

This would be ideally implemented as a graduate research project. Radio collars will be placed on 15 ewes, 15 rams, 10 billies, and 10 nannies in the study area. GPS collars will be placed on 5 ewes, 5 rams, 3 billies, and 3 nannies. Each collared individual will be visually located weekly. Pertinent geographic (i.e., utm coordinates) and demographic (i.e., group size) data will be recorded. When a mortality occurs the carcass of the animal will be promptly located. If possible, cause of death will be determined. A known-fate analysis will be used in Program MARK to estimate survival rates. Locational data will be used in a geographic information system to determine habitat use, animal movements, and home range sizes. Data from the GPS collars will be compared to data collected from visual locations of radio collared animals.

E. Location

West Hawaii District, Puu Waawaa Forest Reserve and Puu Anahulu Game Management Area.

F. Cost

$ 125,400.00

Item	Price/unit	# of units	Total
R-1000 receiver	$ 700.00	2	$ 1,400.00
Data Management	$ 125.00	70	$ 8,750.00
GPS Collars	$ 700.00	70	$ 49,000.00
Helicopter Time	$ 850.00	40	$ 34,000.00
Misc Equipment	$ 5,000.00	1	$ 5,000.00
Misc Travel	$ 3,000.00	1	$ 3,000.00
Graduate Student Salary	$ 30,000.00	1	$ 30,000.00
Total			$ 131,150.00

Project 4 W-29-GR-1 Game Mammal Research: Determine Overall Genetic Diversity of Muflon Sheep within the Lanai Cooperative Game Management Area: Maui County

A. Need

The Lanai Cooperative Game Management Area has a Mouflon sheep population that includes a class of rams known as "non-typical". Non-typical rams are defined as a male sheep whose horns are deformed, polled or non-conforming to a normal curled ram. A potential cause for the horn deformities is the lack of genetic diversity. An analysis of overall genetic diversity will either confirm or refute this hypothesis. The results will assist in the overall management of this class of rams.

B. Objective

- Collect 100 Mouflon sheep samples (hair follicles and/or ear cartilage) to determine overall genetic diversity within the Lanai Cooperative Game Management Area Mouflon sheep herd. Samples will be sent to a University for analysis.

C. Expected Results and Benefits

- Analysis of Mouflon samples will determine whether the potential lack of genetic diversity of the Mouflon sheep herd within the Lanai Cooperative Game Management Area is a potential cause of horn deformities. Answers to this question will determine management strategies for the eventual elimination of this ram class.

D. Approach

A point of contact will be set up at a University and samples sent for analysis. Hunters will be asked to provide samples of Mouflon sheep harvested during the hunting season. Staff and the hunting public will be provided with instruction sheets and kits for the holding of samples prior to the shipment to the university.

E. Location

Maui County, Lanai Island, Lanai Cooperative Game Management Area.

F. Cost $15,000

Project 5 W-24-GO-01 Game Operations and Maintenance: Hawaii County - East Hawaii District

A. Need

East Hawaii District is the largest district in the state, with 13 public hunting areas totaling 465,499 acres. Game program operations facilities are scattered throughout the island and maintenance requires considerable travel time and expense. The deterioration of fences, roofs, water storage sheds, and metal pipelines have been exacerbated by years of volcanic fallout. The subtropical climate also leads to rapid rotting of wooden structures. These factors combine to increase the frequency of maintenance work that is needed to maintain the cost/benefit ratio of developmental investments. All nine (9) checking stations must be regularly inspected and kept operational in the face of vandalism.

B. Objectives

Operate and maintain facilities and infrastructure in 13 public hunting areas totaling 465,499 acres in order to support wildlife management activities and provide wildlife oriented recreation opportunities to the people of Hawaii. Maintain baseyard facilities. Conduct nuisance wildlife investigations and solutions throughout the whole district.

C. Expected Results and Benefits

Continue to provide opportunities for wildlife recreation activities, including provision for an estimated 50,000 hunter trips for the five-year duration of the project, and an estimated annual harvest of 400 pigs, 100 goats, 100 mouflon sheep, 100 feral sheep, 500 quail, 500 pheasant, 500 chukar partridge, 500 francolin, 200 turkey, and 200 dove.

D. Approach

Maintain nine (9) hunter checking stations and other support buildings, 22 game bird water units and feeders; maintain and replace as needed five (5) miles of fence, and 150 hunting area boundary signs. Twenty-two miles of roads will be maintained by grading the existing road bed. Two vehicles will be replaced in years 2 and 3 respectively. Traps for feral pigs will be constructed for pig removal in conservation areas.

E. Location

Kapapala, Kau, and Kipuka Ainahou CGMA's and other public hunting areas throughout the East Hawaii District of Hawaii Island

Project 6 W-24-GO-02 Game Operations and Maintenance Hawaii County - West Hawaii District

A. Need

West Hawaii District oversees 23 public hunting areas covering over 250,000 acres. Many of the popular hunting areas are found within the island's rain shadow and receive a very limited amount of rainfall. There are over 60 wildlife guzzlers scattered throughout these arid Hunting areas and many are in disrepair and need to be replaced or renovated. Exclosures, boundary and informational signs, roads, fences, facilities, and hunter checking stations need to be inspected and maintained.

B. Objectives

Operate and maintain facilities and infrastructure in 23 public hunting areas in order to support wildlife management activities and provide wildlife oriented recreation opportunities to the people of Hawaii.

C. Expected Results and Benefits

Maintaining existing improvements within the hunting areas will facilitate wildlife restoration efforts for game and non-game animals which in turn provide safe and high quality recreational opportunities for hunters and non-hunters alike.

D. Approach

Maintain eight hunter checking stations and other support buildings, boundary fences, and 60 game bird water units and feeders; maintain and replace as needed, five fence exclosures, five miles of waterline, over 60 miles of roads, and 300 hunting information and area boundary signs.

E. Location

Island of Hawaii - West Hawaii District

Project 7 W-24-GO-03 Game Operations and Maintenance- Maui County

A. Need

Increased awareness and interest in the outdoors has increased the demand for multi-use areas in Maui County. In the recent past approximately 20,000 acres of public hunting lands within Maui County has been lost because of their withdrawal from public use by private or public landowners. As available public hunting areas are at a premium and the recreational demands by both the hunting and non-hunting public are beyond the capacity of the available areas, it is ever more important that operation and maintenance of existing facilities be optimized to obtain the fullest recreational benefit from these areas.

B. Objectives

Operate and maintain facilities and infrastructure in nine public hunting areas totaling 141,311 acres in Maui County (91,311 on Maui, 20,000 on Molokai, and 30,000 on Lanai) in order to support wildlife management activities and provide wildlife oriented recreation opportunities to the residents of Maui County and the rest of the State.

C. Expected Results and Benefits

For the five year duration of this project, within Maui County, approximately 2,000 hunting days are expected annually, with a harvest of 750 feral pigs, 650 feral goats, 30 axis deer, 300 pheasants, 500 chukar, 300 francolins, and 100 doves

D. Approach

Island of Maui:

- Routine maintenance of three (3) check station building done on a monthly basis,
- 50 signs and markers will be checked per year, changing any as needed.
- Two (2) miles of fence maintenance per year,
- 14 water units checked and maintained once a week
- Nine (9) self-check hunter check stations maintained once a week.
- Maintain throughout the year 30 miles of access roads through grading, filling, and hand removal of vegetation along edges.
- Check and maintain one (1) access gate throughout the year.
- Throughout the year remove brush along two (2) miles of road.
- Herbicides are not to be used.

Island of Molokai:

- Routine maintenance of two (2) baseyard buildings conducted once a month
- Check 20 signs and markers per year, changing any as needed.
- Check and maintain one (1) mile of fence per year
- Seven (7) water units checked and maintained once a week.
- Check and maintain on a weekly basis two (2) self-check hunter check stations.
- Maintain three (3) access gates per year.
- Herbicides are not to be used.

Island of Lanai:

- Check and maintain five (5) fenced-in water units once a week,
- Maintain one (1) hunter check station and one (1) building once a month
- 20 signs and markers checked per year, changing any as needed
- Three (3) fence enclosures checked and maintained twice a year

- Five (5) miles of water line maintenance per ye
- Maintain up to 10 miles of roads through the use of heavy machinery that includes, but not limited to dozers and graders. Remove any vegetation that exists along roads within the public hunting area.

E. Location

Public hunting areas on the islands of Maui, Molokai, and Lanai

Project 8 W-24-GO-04 Game Operations and Maintenance: Honolulu County

A. Need

Existing game management improvements, habitat management areas, and facilities require ongoing repair and maintenance in order to provide the maximum opportunity for recreational hunting

B. Objectives

To operate and maintain buildings, structures, and infrastructure in 14 Public Hunting Areas (PHA) and one Game Management Area (GMA), totaling 32,000 acres, to support wildlife management and wildlife oriented recreation opportunities. This includes maintenance of:

- Baseyard buildings used to house equipment, staff and tools for operations
- Game bird guzzler units which provide water for game birds at Kuaokala GMA
- Roads and trails will be monitored and maintained by staff to ensure public access to Hunting Areas.
- Signage will be inspected and maintained so information is disseminated properly to hunters and other users in the areas
- Cattle fences will be inspected and maintained to ensure cattle are restricted to paddocks specific to grazing management objectives. DOFAW staff will work with ranchers to ensure objectives are consistent with habitat management needs.
- Hunter Check Stations will be inspected and maintained to ensure that they are serving as an effective structure to collect relevant information.

C. Expected Results and Benefits

The wildlife management areas on Oahu are expected to provide approximately 3,000 hunter days of recreation, resulting in a harvest of approximately 500 feral pigs, 125 feral goats, and 300 game birds annually. Maintenance of access trails and roads provides a secondary benefit to non-huntingsegments of the public by providing access to hiking and camping areas. Maintenance of infrastructure, water lines, fences are integral to continue to enhance habitat and game populations in Game Management Areas.

D. Approach

The following existing infrastructure will be inspected and maintained (4x/year):

- Two (2) baseyard buildings
- Twenty-six (26) game bird feed stations and water units
- Twenty (20) miles of existing access roads, in heavily disturbed habitat, will be maintained by grading and hand-clearing of vegetation.
- Eighteen (18) miles of existing trails, in heavily disturbed habitat, will be maintained by hand-clearing of vegetation
- Two (2) miles of boundary/cattle fence.
- Signage in PHAs and GMAs (Aprox. 150 signs/Year)
- 15 mi of waterline at Kuaokala GMA per year.

The following existing structures will be inspected and maintained (1x/year)

- 12 hunter check-in stations

E. Location

Public Hunting Areas, and Kuaokala GMA, Oahu.

Project 9 W-24-GO-05 Game Operations and Maintenance Kauai County

A. Need

Existing game management roads, trails, fences, exclosures, game bird and mammal hunter checking stations, storage buildings, campsites, feeding sites, watering units and hunting area management signs will require annual repairs and maintenance to maintain a viable recreational hunting program in areas planned for continued hunting on Kauai. Without maintenance of this infrastructure, recreational mandates for public hunting cannot be adequately met.

B. Objectives

- Maintain and operate 14 mailbox type and seven (5) building type hunter checking stations for the collection of game harvest data and measurement of hunter effort in 13 hunting units.
- Maintain game bird water units (rain catchments, tanks and pipes with the Kekaha GMA - Hunting Unit A (an area zoned for agriculture and designated for sustained yield
- Hunting by DOFAW) to encourage game bird nesting and more even distribution of game mammals in exceptionally dry habitats where little natural water occurs
- Maintain existing boundary fences, cattle guards and exclosure fences to keep feral livestock out of the forest reserve areas, natural areas, and sites where remnant listed endangered plants occur.
- Maintain existing jeep roads and trails in all public hunting areas to facilitate hunter access to both sustained yield hunting areas and to areas needing ungulate control.
- Maintain hunter campsites in remote areas to encourage hunting pressure in areas needing animal control.
- Maintain feeding sites in the Kekaha GMA and Wailua GMA - Hunting Unit I (sustained yield hunting area) to encourage game bird nesting and occupation of areas that otherwise would support low natural populations.
- Maintain six (6) storage buildings necessary for protection of materials, equipment and supplies from theft or damage caused by exposure to the elements.
- Maintain approximately 340 hunting area boundary, safety zone and instructional signs to manage public hunting.
- Maintain 350 acres of rangelands through annual mowing and brushing to keep game habitat is optimal conditions.

C. Expected Results and Benefits

The maintenance of game bird and mammal infrastructure in public hunting areas, forest reserves, natural areas and portions of State Parks (open to hunting) will enable DOFAW to satisfy the recreational mandates for its public hunting program, as well as manage hunting activity for the benefit to threatened and endangered species and native ecosystem protection.

D. Approach

- Fourteen (14) mailbox-type hunter checking stations, five (5) small building-type hunter checking stations, and six (6) storage buildings need regular maintenance such as cleaning, painting, and routine repairs when damaged by vandals or severe weather.
- Forty (40) game watering units (rain catchments, tanks, guzzlers, and l.5 miles of pipeline) and twenty (20) game feeding sites in the Kekaha and Wailua GMAs (Hunting Units A and I) need regular cleaning and maintenance to keep them operational. During summer and fall months, units will be maintained on a bi-monthly basis to ensure water levels are adequate. During the winter and spring months, water units will be inspected bi-monthly.
- Eighty (80) miles of existing jeep roads, and fifty (50) miles of trails used by hunters for access

require annual maintenance after storm damage, weed overgrowth, and rutting from heavy use

- Approximately 0.75 miles of existing boundary fence, cattle guards, gates, and game range and plant protection fencing require bi-monthly inspections for needed repairs, and replacement of broken fencing when it occurs.
- Approximately 330 hunting area management signs, for designating hunting area boundaries, safety zones, and instructions to hunters need to be inspected tri-monthly for loss and vandalism requiring repairs or replacement.
- Approximately 350 acres of grass and brush rangelands with the Kekaha and Wailua GMAs will be annually mowed and brushed using 4 x 4 tractors pulling a various attachments for mowing, shredding, brushing and disc-harrowing. Heavy-equipment activities will occur during the summer and early fall months when weather conditions are good.

E. Location.

Game water units and feed sites maintained under this project are located in the Kekaha and Wailua GMAs. Hunting checking stations, storage buildings, jeep roads and foot trails, signs, exclosure fences and boundary fences occur in various forest reserves, natural areas, and portions of State Parks.

Project 10 W-25-GP-01Game Population Management Hawaii County East Hawaii District

A. Need

Demand for recreational game bird hunting continues to increase while mortality continues due to diseases and predation from introduced mongooses, rats, feral cats and feral dogs. Population management is needed to restore game bird populations depressed by predation..

B. Objectives

- Enhance game bird populations at Kapapala Ranch, Mauna Loa, and Kipuka Aina Hou PHA's by reducing predators and monitoring disease, thus enhancing reproduction and survival of game birds.

C. Expected Results and Benefits

The reduction in numbers of predators and subsequent increase in game bird reproduction and survival will increase the number of game birds in Kapapala, Mauna Loa, and Kipuka Aina Hou PHA's. Reducing disease and predation by 50% would potentially double game bird populations. Game birds will be checked for pathogens to determine the effects of parasitism and disease as limiting factors. Increased chick production is expected to result in an additional harvest of 2,900 game birds per year and an additional 2,000 hunter recreation days, a substantial increase in wildlife recreation opportunities.

D. Approach

Predators will be reduced by trapping introduced mongooses, rats, feral cats and feral dogs. Disease testing will be done at checking stations and in hunting areas. Game birds will be checked for pathogens to determine the effects of parasitism and disease as limiting factors. Investigations will be conducted in cooperation with the Animal Industry Branch of the State Department of Agriculture.

E. Location.

Predator reduction will be conducted at Kapapala Ranch, Mauna Loa, and Kipuka Aina Hou PHA's.

A. Need

There are no native mammalian predators in Hawaii. Niches for small and medium-sized predators are filled by introduced Indian mongooses, feral dogs and cats, and rats. In many instances they are the primary limiting factors on ground-nesting birds. There are no naturally occurring large predators to control these introduced predators. Although game bird population levels are closely linked to annual precipitation, predation can be another limiting factor especially during the nesting and brood rearing seasons. Predator population management plays a key role in relieving predation pressure on game bird populations. Where game mammal management is allowed, mineral and feed supplements will be provided to improve the health of the population. In areas where control of game mammals' populations is conducted, the Division implements management practices to increase public access to those game resources whenever safe, feasible, and effective. Those practices include deployment of fences to manage game movement, public harvest of game to reduce population levels, staff control of game where needed, and salvage of harvested game for public use. In some areas, fencing is necessary to delineate state boundaries for hunting areas and to prevent mammal populations from encroaching on roads for public safety.

Project 11 W-25-GP-02 Game Population Management Hawaii County - West Hawaii District

A. Need

There are no native mammalian predators in Hawaii. Niches for small and medium-sized predators are filled by introduced Indian mongooses, feral dogs and cats, and rats. In many instances they are the primary limiting factors on ground-nesting birds. There are no naturally occurring large predators to control these introduced predators. Although game bird population levels are closely linked to annual precipitation, predation can be another limiting factor especially during the nesting and brood rearing seasons. Predator population management plays a key role in relieving predation pressure on game bird populations. Where game mammal management is allowed, mineral and feed supplements will be provided to improve the health of the population. In areas where control of game mammals' populations is conducted, the Division implements management practices to increase public access to those game resources whenever safe, feasible, and effective. Those practices include deployment of fences to manage game movement, public harvest of game to reduce population levels, staff control of game where needed, and salvage of harvested game for public use. In some areas, fencing is necessary to delineate state boundaries for hunting areas and to prevent mammal populations from encroaching on roads for public safety.

B. Objectives

- Increase game populations at Puu Waawaa Cooperative GMA, Mauna Kea Forest Reserve, Kaohe and Puu Anahulu GMA's, and Kahua Special Permit Area by reducing predators, thus enhancing reproduction and survival of game birds. Improve health of game mammal populations where appropriate.
- Increase quality of game bird habitat though outplanting of native species in fenced units at Puu Waawaa and Puu Anahulu.
- Control weeds in and around fenced units to increase the quality of game bird habitat.
- Control game mammal populations, where needed, in public hunting areas using public hunting and staff control.
- Salvage game resources for public use in control areas where practical.

C. Expected Results and Benefits

The reduction in predation, the increase in quality of game bird habitat, and the subsequent increase in game bird reproduction and survival will increase the annual production of game birds. This will result in increased game bird harvest and hunter success. Supplementation of minerals and feed to mammal population swill improve health, especially during droughts, and draw animals away from ecological sensitive areas. Control of game mammals populations where needed will enhance habitat by reducing the impacts of browsing and grazing.

D. Approach

- 60 -100 traps will be deploy year-round for rats, mongooses, feral cats and feral dogs
- Utilize supplements for game management.
- Salvage will be conducted using helicopters or other suitable vehicles for transport up to 12 times per year
- Fencing boundaries and interior fencelines to manage game population movements - 3 miles per year

E. Location

Predator reduction and game mammal population management may be conducted at Kaohe GMA, Mauna Kea Forest Reserve, and other public hunting areas. . Predator reduction and game bird population management may be conducted in Puu Anahulu GMA's, Mauna Kea and Puu Waawaa Forest Reserves, and other public hunting areas.

Project 12 W-25-GP-03 Game Population Management: Maui County

A. Need

Demand for recreational game bird and game mammal hunting continues to increase, yet populations of game birds and mammals cannot keep pace with demand. One reason for inadequate production is heavy predation losses from introduced mongoose, rats, feral cats and feral dogs. Population management is needed to prevent excessive losses to predation. In order to restore game birds to their carrying capacity in nesting areas, introduced predators must be significantly reduced or eliminated.

B. Objectives

- Restore game bird populations at the Kahakuloa GMA, the Lanai Cooperative GMA, Molokai Forest Reserve PHA, and the Kula Forest Reserve through a predator control program.
- Purchase mongoose and cat traps as needed

C. Expected Results and Benefits

The reduction in numbers of predators and subsequent increase in game bird survival and reproduction will increase the number of game birds in the Kahakuloa GMA, Kula Forest Reserve, the Lanai Cooperative GMA, and Molokai Forest Reserve PHA. Reducing predation by 50%, would potentially double the recruitment of young to the game bird population. This increased chick production would result in an additional harvest of 450 game birds per year and an additional 600 hunter days of recreation, a substantial increase in wildlife recreation opportunities to the people of Maui County. Replacing increasingly dysfunctional traps with new ones will facilitate predator removal.

D. Approach

Numbers of predators will be reduced by trapping introduced mongoose, rats, feral cats and feral dogs. Traps used in all instances will be either snap traps for rats and mongoose or have-a-hart traps for feral cats and dogs. Both types of traps will be baited with preferred foods of the species being controlled. Kahakuloa Game management area will have eight (8) traps set and checked once a week during the months of February through July. Kula Forest Reserve will have eight (8) traps set and checked once a week during the months of February through July. The Lanai Cooperative Game Management Area will have 16 traps set and checked once a week during the months of February through July.

E. Location

Predator reduction will be conducted at the Kahakuloa GMA, Kula Forest Reserve on Maui, the Lanai Cooperative GMA, and Molokai Forest Reserve Public Hunting

Project 13 W-25-GP-04 Game Population Management: Honolulu County

A. Need

There are no native mammalian predators in Hawaii. Niches for small and medium-sized predators are filled by introduced Indian mongooses, feral dogs and cats and rats. In many instances they are the primary limiting factors on ground-nesting birds. There are no naturally occurring large predators to control these introduced predators. Demand for recreational game bird and game mammal hunting continues to increase, yet populations of game birds and mammals cannot keep pace with demand. Game bird populations are kept at very low numbers because of predation from introduced mongooses and rats, and by feral cats and dogs. In order to restore game birds to their carrying capacity in nesting areas, introduced predators must be reduced or eliminated.

B. Objectives

- Protect populations of wild francolin, quail, pheasant, partridge, dove, and turkey and other game ds by reducing predation by mongooses, cats, rats and dogs through the use of live traps.

C. Expected Results and Benefits

The reduction in numbers of predators and subsequent increase in game bird reproduction and survival could increase the hunter success ratio per hunter trip by 20 percent over five years.

D. Approach

60 live traps will be deployed year-round to control mongoose, cats and other non-native predators Free-roaming feral dogs will be trapped in live cage traps when presence is detected Live trapping: Traps will be deployed near guzzlers to protect chicks and juvenile birds. Traps will also be deployed in areas where birds are most vulnerable, determined by staff. Free roaming animals will also be removed opportunistically. Other predators detected in the area will be trapped as situation dictates.

E. Location.

Honolulu County, Island of Oahu

Project 14 W-25-GP-05 Game Population Management: Kauai County

A. Need

There are no native mammalian predators in Hawaii. Niches for small and medium-sized predators are filled by introduced feral cats, feral dogs and rodents. In many instances they are the primary limiting factors on ground nesting birds. There are no naturally occurring large predators to control these introduced predators. Demand for recreational game bird and game mammal hunting continues to increase, yet populations of game bird and mammals cannot keep pace with demand. One reason for the inadequate production is heavy predation losses from introduced feral cats, feral dogs and rats. Population management is needed to meet goals of increased game hunting opportunities. In order to restore game birds to their carrying capacity in nesting areas, the introduced predators must be reduced or eliminated.

In May 2012 on the Island of Kauai, which has been historically mongoose free, two Indian mongooses (*Herpestes edwardsii*) were captured in Lihue, Kauai. The crisis triggered local wildlife agencies to pool resources and manpower to respond to the immediate threat. Kauai DOFAW responded by providing a fourwheeled drive truck, 120 traps and other supplies. An emergency hire position was established using a vacant wildlife technician position until funding could be secured to hire trained trapping personnel. The emergency hire position is a temporary position which will be terminated at the end of FY13 - June 30, 2013. There is an urgent need to increase funding to hire two (2) trained trapping personnel to address the mongoose crisis on Kauai. It is imperative that Kauai remains mongoose-free as the island is home to the largest population of threatened and endangered birds in the Hawaiian Islands. This includes the Newell's shearwater (*Puffinus newelli*), Hawaiian petrel (*Pterodroma sandwichensis*) and Hawaiian goose (*Brantasandvicensis*). Upland game birds such as the Ring-necked pheasant (*Phasianus colchicus*) and Erckel's francolin (*Francolinus erckelii)* would also be severely impacted.

B. Objectives

Enhance game bird populations at the Kekaha and Wailua GMAs and other areas where the control of non-native predators are necessary. To eliminate the threat of the Indian mongoose becoming established on the island of Kauai

C. Expected Results and Benefits

The reduction in numbers of predators and subsequent increase in game bird recruitment and survival will increase the number of game birds in the Kekaha and Wailua GMAs. Reducing predation by 50%, would potentially double the recruitment of young birds. The increased chick survival would result in an additional harvest of 500 game birds per year and additional 500 hunter- days of recreation, a substantial increase in wildlife recreational hunting opportunities. The total eradication of the Indian mongoose will be a positive impact on the continued survival of listed and non-listed wildlife species on Kauai.

D. Approach

Predators such as feral dog, feral cat, and rodent will be reduced by a combination of trapping and maintaining rodent bait stations. Approximately 50 traps and 50 rodent bait stations will be maintained during the spring and summer months. Traps will be inspected daily and bait stations will be inspected bi-weekly. The complete eradication of the Indian mongoose will involve the use of all available tools and resources including various traps and baits, trapping techniques. Approved toxicants will be tried in combination of strategies and tactics in collaboration with the wildlife conservation agencies.

E. Location
Kekaha GMA, Kauai, Hawaii
Wailua GMA, Kauai, Hawaii.
Other approved lands where predator control is justified

Project 15 W-26-GH-01 Game Habitat Management: Hawaii County - East Hawaii District

A. Need

Much of the game bird habitat in game management areas has been degraded by the dense growth of alien vegetation. This problem is particularly severe in the Kipuka Aina Hou area where introduced Himalayan Raspberry and gorse is spreading over a 1,000 acre area. The Himalayan Raspberry will be removed in order to increase game bird habitat. Gorse is pulled and destroyed by burning.

Dense, mature stands of fayae bush and guava in the Kapapala Ranch CGMA offer little to no value as game bird habitat. Removal of this vegetation type will reduce competition and provide better forage and cover for game birds.

B. Objectives

- Improve game bird habitat annually by clearing 70 acres of dense and otherwise undesirable introduced vegetation in the Kapapala cooperative hunting area.
- Annually clear, plant, and fence food plots equaling 5 acres for game birds in the Kapapala Ranch Cooperative GMA, and take advantage of cattle grazing and controlled burns to maintain desired vegetation stages.

C. Expected Results and Benefits

This project will improve at least 70 acres per year of wildlife habitat degraded by undesirable growth in the Kapapala CGMA and will clear, plant and fence five (5) acres in the area. The game bird habitat improvement is expected to encourage game birds by 15 to 20% per year. Additionally, enclosure fences around cleared areas will direct the grazing activities of ungulates and create a desired edge effect for game birds. These activities are expected to eventually double the carrying capacity for game birds and reduce the threat of total habitat destruction by wildfire from fuel overload.

D. Approach.

Mature, dense stands of fayae bush and guava will be cut and the stumps poisoned by trained technicians in Kapapala Ranch CGMA. Once removed, cleared areas have been managed to maintain desirable vegetation stages by mowing, controlled burns, grazing cattle. Managed cattle grazing can be an effective method to maintain habitat with minimal use of manpower and equipment. In areas where managed grazing is not practical, game bird habitat will be maintained by mowing, and controlled burns. Cleared patches will be planted with food crops and areas fenced to control cattle overgrazing. Burning and livestock grazing will be done selectively in pastures to maintain a vegetation stage best suited for game bird habitat.

E. Location.

This project will be conducted in Kapapala Ranch Cooperative GMA.

Project 16 W-26-GH-02 Game Habitat Management: Hawaii County - West Hawaii District

A. Need

Food, water and cover are all important elements of habitat management for game species. Goals for upland game bird habitat management for sustainable yield include providing food, water and cover. Typically, upland game birds in the West Hawaii District occur in early successional habitats and/or open canopy forests. The reason is that most gallinaceous bird species rely on walking and running for general movement over flying. As such, habitat that is easy for them to move through will reduce predation from predators using dense cover for ambush. The management techniques to increase ground mobility of upland game birds include mowing, prescribed burns, and utilizing livestock grazing. Native outplanting activities in upland fenced exclosures will provide increased quality of game bird habitat. Weed control activities in these fenced units will reduce cover for predators and increase the success of established outplant populations. Mowing and prescribed burns, when used properly, can also provide food opportunities by making seeds and invertebrates more accessible and also encouraging new plant growth outside of large fenced exclosures. Invertebrates can be an important food source especially for juveniles when a high protein diet is essential for growth and development. For food the planting of crops (i.e., legumes, forbs, etc.) can be beneficial but also costly. Water, especially during drought conditions, can be a limiting factor of habitat for the game species. The construction of water units is covered under game facilities construction. The lack of sufficient cover for upland game birds is not as limiting as other habitat constraints. Overall, upland game bird habitat management in the Western District includes mowing, researching the usage of prescribed burns, establishing food plots where appropriate, and outplanting native trees and shrubs to provide food and cover for both game and non-game species.

B. Objectives

- Work to alleviate habitat loss in degraded public hunting areas through tree and shrub plantings in the Kaohe GMA.
- Initiate habitat improvements for game birds, including mowing and establishing food plots in areas outside of large exclosures, most hospitable to game, using non-invasive plants.
- Initiate outplanting of native plant species, for increased quality of game bird habitat, up to 6000 plants per year.
- Reduce fire threat to game bird habitat plots area in Puu Anahulu GMA.

C. Expected Results and Benefits

This project will improve annually at least 15 acres of wildlife habitat degraded by undesirable growth in the Kaohe GMA and begin to alleviate habitat loss. These activities are expected to increase the carrying capacity for game birds and reduce the threat of catastrophic habitat destruction by wildfire. Species of shrub/trees planted will provide additional fruit and berries for game birds. Exclosures are to be constructed in Puu Anahulu GMA and Puu Waawaa FR to improve game bird habitat. areas.

D. Approach

- Annually plant up to 2500 shrub/tree seedlings in select areas
- Construct planting exclosures (2-3 acres) 1-2 per year in degraded habitat to initiate habitat improvements for game species.
- Strip mow 15 acres of game habitat per year
- Create game bird habitat and food plots (2ac/yr.)

- Maintain firebreaks around exclosures

E. Location

Kaohe and Puu Anahulu GMA's, Mauna Kea and Puu Waawaa FR's and other areas in the Western District.

Project 17 W-26-GH-03 Habitat Management: Maui County

A. Need

The increase in numbers of hunters coupled with the loss of public hunting lands within Maui County has placed greater demands on game resources. Increasing the game bird carrying capacity through habitat management/manipulation will help to increase hunting opportunities in areas of high use. Habitat management within the designated areas are necessary to improve feeding, nesting and brooding habitat for game birds. Many of these areas are dominated by non-native grasses that offer poor game bird habitat. Grasses that currently dominate the landscape restricts game bird movement, provides little to no food, and offers poor brooding habitat. Careful management of these areas may result in adequate overall game bird habitat.

B. Objectives

- Clear or thin undesirable vegetation at the Kahakuloa GMA in order to provide improved habitat doves, francolins, and pheasants.
- Clear or thin undesirable vegetation in Unit 3 of the Lanai CGMA, which will enhance habitat for pheasants, turkeys, doves, and francolins.
- Construct 1-2 acre game bird food plots. Providing a stable food source throughout the year in areas devoid of food will help increase reproductive success and survivability of game birds.

C. Expected Results

Provide an additional 600 hunter days and harvest of 750 game birds

D. Approach

Kahakuloa GMA:

- Annually clear 30 acres of brush and undesirable non-native vegetation such as Christmas berry, Haole Koa (*Luceana Leucocephalla*), and Kiawe (*Prossopis Pallida*) using a small bulldozer, with some clearing/maintenance done using hand tools. Where appropriate, use of a tractor to mow undesirable grasses to create open pockets for loafing and foraging. Brush will be cleared before the start of the game bird nesting season (February) and before the start of the game bird season (October). Desirable game bird food plants may be planted in the cleared sites.

Lanai CGMA:

- Bi-annually clear portions of unit 3 using a tractor with an attached mower to reduce the abundance and density of undesirable grass species. Mowing of undesirable grasses within the Lanai CGMA will provide open areas for game birds to loaf and forage. Mowing will occur in February and October. Desirable game bird food plants may be planted in the cleared sites.
- Construction of a 1-2 acre food plot within Unit 3 of the Lanai CGMA will provide game birds with a stable food source throughout the year which will result in better survival and reproductive success. Food sources planted will be evaluated in ensure that no invasive species will be introduced. Construction of food plots will be in fiscal years 14 and 16.
- Site surveys to locate threatened and endangered plants will be conducted prior to habitat management site selection. Threatened and endangered plants will either be fenced, or areas of high sensitivity will not be part of the management scheme.

E. Location

Kahakuloa GMA on the island of Maui, and Unit 3 of the Lanai CGMA

Project 18 W-26-GH-04 Game Habitat Management: Honolulu County

A. Need

Habitat management is necessary in the Kuaokala GMA to improve the feeding, nesting and loafing habitat for game birds. Much of the area is in need of restoration due to a history of inappropriate range management and generally poor soil and weather conditions. The plant species present are dominated by non-native grass species, which provide little food value for game birds unless carefully managed. These grasses grow in dense stands, which offer cover around the edges, but are little utilized because their high density restricts game bird movement, feeding, and loafing.

B. Objectives

- Seeds of local tree species will be collected for propagation and outplanted when appropriate. Stands of native plants will be protected and enhanced by eliminating non-native weeds. Site surveys to locate threatened and endangered plants will be conducted prior to habitat management site selection and vegetation clearing. Threatened and endangered plants will be fenced and excluded from game habitat improvement areas.
- Invasive brush and weeds will be targeted for removal in geographically flat areas. Grasses and brush will be controlled by mowing in cleared areas. Feed sources will be established with food plots in areas most hospitable to game birds. Where appropriate, Paspalum grass, sorghum, corn and/or millet will be planted to provide plants that provide food and cover for game birds. Grazing will be done on a rotational basis to control grasses in areas that cannot be mowed.

C. Expected Results and Benefits

To increase the number of game birds at the Kuaokala GMA in order to provide hunting for 700 hunters per season, with a harvest of 200 birds

D. Approach

- Outplant native trees to aid in vegetation management (50 trees/year)
- Spread 500lbs of grass seeds to enhance desirable grass production
- Create game bird habitat (1ac/year)
- Strip Mow 15 acres of game bird habitat (2x/year)
- Create .5 acres of food plots to aid in game bird populations

E. Location

Kuaokala GMA.

Project 19 W-26-GH-05 Game Habitat Management: Kauai County

A. Need

Completion of planned game habitat improvements are needed on selected portions of the Kekaha and Wailua GMAs designated for sustained yield hunting. Several hundred acres of public hunting area have become overgrown with undesirable vegetation such as molasses grasses (*Milinis minutiflora*) and Bushy beardgrass (*Schizachirium condensatum*) and weed shrubbery such as Lantana (*Lantana camara*), which can be restored to excellent game bird habitat by clearing and planting with beneficial grasses such as Bahia grass (*Paspalum notatum*), and Bermuda grass (*Cynodon dactylon*). Game bird productivity and access for hunters to harvest game birds has been hampered by this weedy overgrowth.

B. Objective

- Clear, in contour strips, a total of 200 acres (40 acres per year) of undesirable vegetation
- Replace undesirable invasive grasses, shrubs and trees with beneficial grass species in Kekaha and Wailua GMAs.

C. Expected Results and Benefits

Planned strip clearing and planting is expected to improve game bird productivity and survival by doubling the available nesting and feeding habitat. It also is expected to improve access for hunters to areas currently overgrown with impenetrable weed growth. This improvement will also reduce the chance of catastrophic brush fires by creating fire breaks within dense stands of flash fuels within Kekaha and Wailua GMAs.

D. Approach

An environmental assessment has been completed for the work planned, as this project is a continuation of the previous grant project. Habitat areas will be cleared by bulldozing, harrowing and/or mowing on 50 to 70 foot wide contour strips, and planted with Bahia grass and/or Bermuda grass. This job is planned to be conducted by contract following State procurement guidelines and rules due to limited in-house resources to complete the job on time.

E. Location

This project will be conducted on the island of Kauai within Kekaha GMA and Wailua GMA.

Project 20 W-27-GF-01 Game Facilities Construction Hawaii County - East Hawaii District

A. Need

Large portions of Kapapala and Kipuka Aina Hou CGMA's are only seasonally occupied by game birds because there is no permanent source of water. Additional game bird water units will expand game birds in the CGMAs. Informational signs are needed to ensure hunter compliance with hunting area boundaries, seasons and other hunting regulations. No hunter check -in station exists to facilitate hunter data recording which is needed for proper management. Hunting trends in the Kau Forest Reserve require accurate assessment.

B. Objectives

- Enhance game bird populations and obtain better distribution of game by installing water guzzlers Kipuka Ainahou CGMA.
- Promote hunter compliance by installing 500 additional informational signs and markers .
- Build hunter check-in station to accommodate Kau hunters

C. Expected Results and Benefits

Increase the number and distribution of game birds in Kapapala GMA by expanding their range to areas where there is no current permanent water source. This is expected to encourage more hunter trips and a broader distribution of game birds.

D. Approach

Purchase and install of water units and 500 signs. Build a hunter check-in station at the trailhead to Mountain House and Wood Valley.

E. Location

Kapapala, Kau, and Kipuka Ainahou CGMA's and other public hunting areas throughout the East Hawaii District of Hawaii Island

Project 21 W-27-GF-02 Game Facilities Construction Hawaii County - West Hawaii District

A. Need

Informational signs are also needed to promote hunter compliance with hunting area boundaries and other hunting regulations. Buildings are needed for protection and storage of game management materials and supplies.

B. Objectives

- Promote hunter compliance by installing/replacing informational signs and hunter check stations.
- Storage buildings, baseyard facilities and other infrastructure will be replaced or constructed to ensure they can support game program operations

C. Expected Results and Benefits

Increase in the number and distribution of game in the West Hawaii District by expanding their range to areas where there is no current permanent water source. The result of this improvement will be increased game harvest and hunter success. Hunter check stations and signs will provide hunter effort and success. Construction and improvements to check stations will be done to ensure data can be collected appropriately.

D. Approach

- Construct 2 miles of water line per
- Construct/replace 4 game guzzlers per year where appropriate
- Construct/repair one hunter check station per year
- Install/replace 100 signs per year
- Inspect and repair buildings once per year

E. Location

Appropriate public hunting areas throughout West Hawaii District

Project 22 W-27-GF-03 Game Facilities Construction: Maui County

A. Need

With the expansion of the Kula Forest Reserve, Hunting Unit C, and increases in hunting pressure within the Molokai Forest Reserve (Hunting Units C, D, and E), there is a need for additional facilities and infrastructure for recreational hunting, such as game bird water units, signs and markers, and additional fencing. Expansion of the Lanai CGMA (Unit 3) also created a need for additional facilities.

B. Objective

- Construct one hunter check station to obtain better distribution of hunters, hunter use, and data on the island of Molokai. FY15.
- Construct one (1) game bird water storage type unit on Maui, Molokai, and Lanai. (Maui - FY15 Molokai - FY16, Lanai - FY14 and 16)
- Install five (5) Signs and markers within public hunting areas each year.

C. Expected Results

- Establishment of a new hunter check station will result in increased awareness of hunter usage and data on hunter harvest of game birds and game mammals
- The construction of water units is expected to enhance game bird chick survival and increase carrying capacity for birds in the area by providing a reliable water source.
- Signs and markers will promote better management and utilization of public hunting areas within Maui County and ensure better hunter compliance.

D. Approach

- One drop box type hunter self-check station on footings will be constructed at a primary entrance the Molokai Forest Reserve PHA.
- On Maui, one storage type water unit will be constructed, in the Kahakuloa GMA or Kula Forest Reserve hunting areas. On Molokai, one (1) storage type water unit will be constructed within Molokai Forest Reserve. On Lanai, two (2) water units, fed by a main water source, will constructed.
- Install five (5) signs/markers per year in specified locations within public hunting areas on the of Maui.

Potential construction sites will be inspected for native plant species and located to avoid impacts to listed species. Site surveys will be conducted prior to building water units and fences in order to lessen the impact of the facilities on listed species.

E. Location

Kahakuloa GMA and Kula Forest Reserve on Maui, Molokai Forest Reserve PHA on Molokai, and Unit 3 of the Lanai CGMA

Project 23 W-27-GF-04 Game Facilities Construction: Honolulu County

A. Need

Construction and/or replacement of game bird guzzlers are needed at Kuaokala GMA to encourage game birds to establish a more uniform population distribution. The construction and/or replacement of hunter checking stations are also necessary to monitor hunter use of public hunting areas. Buildings are needed for protection and storage of game management materials and supplies.

B. Objectives

- Game bird guzzlers will be monitored and replaced as necessary to ensure that they are operating efficiently.
- Hunter check stations will be inspected to ensure they are able to collect the date necessary monitor hunter effort. Older units that are not able to be repaired will be replaced.
- Storage buildings, baseyard facilities and other infrastructure will be replaced or constructed to ensure they can support game program operations. Shelters and other amenities will be constructed support hunters and provide shade in open areas.

C. Expected Results and Benefits

Hunter check stations will provide hunter effort and success data on 5,200 acres of public hunting areas. Construction and improvements to check stations will be done to ensure data can be collected appropriately. Effort and success data will also be collected by surveying individual hunters in the field or over the phone, and by working with the local hunters associations and clubs. Shelters provide and amenity for hunters in the areas.

D. Approach

- Construct/replace one hunter check-in station per year
- Construct/replace one game bird guzzler per year
- Construct one shelter at the Kuaokala GMA.
- Inspect and repair buildings (1x/year)

E. Location

The game bird guzzlers will be located at Kuaokala GMA and Makua Keaau PHA. Hunter check stations will be located at each Public Hunting Areas public access point. Buildings and infrastructure are located at various locations throughout the District.

Project 24W-27-GF-05 Game Facilities Construction: Kauai

A. Need

The newly built Kokee Hunter Checking Station is in need for a new restroom using a septic system. The Kokee hunter checking station services more than eight (8) hunting management units on west Kauai. The building accommodates two wildlife personnel during scheduled hunting seasons and regular working days. At present, a fifteen year compost toilet outhouse has shown signs of over-use and is in need of replacement. The new toilet system will use rain catchment water from the hunter checking station roof where the water will be stored in a water tank. A septic tank will need to be installed and maintained on a regular basis.

The fence line along the western section of the Kekaha GMA (sustained yield hunting area) will need to be replaced after standing for more than 45 years. The fence was maintained for cattle ranging operations by the former Kekaha Sugar Company, which dissolved in 2000 leaving behind remnant cattle and seven miles of fence. Prior to 2000, Kekaha Sugar Company leased portions of the Kekaha GMA from the State. The existing fence is adjacent to the Mana lowlands being used for diversified agriculture. The new fence will need to be upgraded to seven feet high to keep deer from jumping over it. Along the fence, a service route will need to be made for maintenance. Up to a half a mile of new fence per year will need to be constructed to finish the job in ten years.

Plant-protection fences will be needed in Puu Ka Pele, and Na Pali Kona Forest Reserves, two Natural Areas Reserves, and portions of State Parks to protect rare native plants from damage by feral herbivores. Additional signs will be needed to effectively manage public hunting areas.

B. Objectives

- Complete the new hunter checking station in Kokee.
- Plan and construct up to 0.75 miles of fence and access road along the western boundary of the Kekeha GMA.
- Protect remnant endangered plants in highly degraded habitats from ungulate damage constructing fenced exclosures, allowing for sustained yield hunting in surrounding areas.
- Post appropriate informational signs and markers to effectively manage hunting areas.

C. Expected Results and Benefits

The replacement of the old hunter checking station will help alleviate office space shortage in the Lihue area by relocating wildlife personnel to the checking station and improve services to the hunting public. The construction of the fence line and maintenance route will greatly reduce crop damage to local farmers and improve access to hunters along the fence line. Exclosure fences will protect isolated threatened and endangered plants from feral animals, yet enable hunters to utilize the game resources in highly degraded habitats. Appropriate signs will facilitate management of hunters in hunting areas.

D. Approach

All planning, designing and construction of the new Kokee Hunter Checking Station will be contracted to a qualified vendor. Portions of the fence construction may also be contracted to a private vendor. Other sections of the fence job will be done through in-house personnel. Four hundred (350) informational, boundary and safety zone signs and markers (80 per year) will be posted. A total of 0.2 miles of fencing will be used to create small exclosures to protect threatened and endangered plants

within GMA's and forest reserves, to enable continued hunting while protecting endangered plants.

E. Location
Kauai County, Kekaha and Mokihana Ridge GMA's

Project 25 W-28-GS-01 Game Surveys and Inventories (Game Mammal): Hawaii County - East Hawaii District

A. Need

Public hunting pressure has increased in recent years as more hunters compete for the same resources in fewer hunting areas. The purpose of surveys is to document long term population trends to facilitate management through the regulation of bag limits. This is in order to enhance hunting opportunities, maintain sustained yield in appropriate areas, and reduce game mammal population levels in areas designated for protection. Another need is to monitor the impacts of feral game mammals on range quality and determine movements of feral pigs in and around sensitive native wildlife and plant habitats. This information is necessary to ensure that game mammal hunting is conducted to balance recreational opportunities with conservation and restoration of rare and endangered native species. Feral cattle control has recently been offered to hunters and met with tremendous interest. This is expected to continue.

B. Objectives

- Determine the distribution, population densities, reproductive success, status, and trends of game mammals on the island of Hawaii.
- Monitor habitat condition and assess game mammal carrying capacity in PHA's
- Determine game mammal hunter pressure and success, and the effects of hunting on game distribution and numbers.
- Survey new areas for additions to game management areas and expand cattle control efforts.
- Monitor diseases and parasitism in game mammals

C. Expected Results and Benefits

The data collected at hunter check-in stations, and surveys of game mammal populations will be combined with information from previous years to provide a basis for management, development, maintenance
actions, and proposals for research involving game mammals and their habitat. The information produced will be used to assess and adjust hunting regulations such as seasons, bag limits, days, and means of take. Application of the recommendations will maximize wildlife recreation opportunities while insuring
compatibility with forest and wildlife management objectives.

D. Approach

Quantitative information on game mammal populations, distribution, reproductive success and impact on habitat as well as hunter effort and success will be gathered annually. Game mammal survey will be conducted. These surveys include methods for particular species which have been developed to monitor populations or indices of abundance. Surveys include aerial censuses using fixed winged aircraft or helicopter, strip or total area counts on the ground, density indices based upon the occurrence of spoor correlated to habitat type. Diseases and parasites of game mammals and game birds will be monitored as necessary in coordination with the Hawaii State Department of Agriculture.

E. Location of Work

Island of Hawaii, East Hawaii District

Project 26 W-28-GS-02 Game Surveys and Inventories (Game Mammal): Hawaii County - West Hawaii District

A. Need

Public hunting pressure has increased in recent years as more hunters compete for the same resources in fewer hunting areas. The purpose of surveys is to document long term population trends to facilitate management through the regulation of bag limits. This is in order to enhance hunting opportunities, maintain sustained yield in appropriate areas, and reduce game mammal population levels in areas designated for protection

Data are also needed to monitor the impacts of feral game mammals on range quality and determine movements of game mammals in and around sensitive native wildlife and plant habitats. This information is necessary to ensure that game mammal hunting is conducted to balance recreational opportunities with conservation and restoration of rare and endangered native species

B. Objectives

- Determine the status and distribution, population densities, reproductive success, status and trends of game mammals on the island of Hawaii, West Hawaii District.
- Monitor habitat condition and assess game mammal carrying capacity in PHA's.
- Determine game mammal hunter pressure and success, and the effects of hunting on game distribution and numbers.
- Survey new areas as possible candidates for additional game management areas.
- Monitor diseases and parasitism in game mammals.

C. Expected Results and Benefits

The data collected at hunter check-in stations, and surveys of game mammal populations will be combined with information from previous years to provide a basis for management, development, maintenance actions, and proposals for research involving game mammals and their habitat.
The information produced will be used as a basis for wildlife management regulations which maximize wildlife recreation opportunities while insuring compatibility with forest and wildlife management objectives.

D. Approach

- Quantitative information on game mammal populations, distribution, reproductive success and impact on habitat as well as hunter effort and success will be gathered annually.
- Aerial surveys will be conducted at Puu Waawaa and Puu Anahulu and other PHAs for range and distribution of game mammals and habitat quality.
- Track movements of game mammals by utilizing radio and GPS collars
- Other lands with a potential for eventual incorporation into public hunting will be surveyed and pursued. Diseases and parasites of game mammals and game birds will be monitored as necessary in coordination with the Hawaii State Department of Agriculture.

E. Location of Work

Island of Hawaii, West Hawaii District

Project 27 W-28-GS-03 Game Surveys and Inventories (Game Mammal): Maui County.

A. Need

An increasing public demand for recreational game mammal hunting on Maui and Molokai, coupled with the loss of land previously available for hunting has led to declining quality and quantity of hunting opportunities. In addition, a continued influx of people desiring non-hunting outdoor recreation has created additional competition for outdoor recreational opportunities.

Data on the status and trends of game mammal populations and the condition of their habitats are needed to manage these populations effectively and to maximize recreational hunting opportunities, while assuring compatibility with other forest and wildlife management objectives. Information on hunter effort and success is needed to assess game mammal population trends. Habitat surveys are needed to assess game mammal habitat conditions, Status of watershed quality and condition, and the effects these introduced animals may be having on native vegetation communities.

B. Objective

- Collect harvest data to determine game mammal trends and to provide hunters with information related to game management.
- Conduct aerial surveys of designated areas of importance within the district of Maui. The objectives of these aerial surveys will be to determine the status and distribution of game mammal species, their densities, reproductive success and trends.
- Monitor seven (7) transects, 500 meters in length, within the Makawao and Koolau Forest Reserves. Transects are monitored twice a year (spring and fall) and various information (digging, scat, etc.) are collected at 50 location along each transect.
- Every other year in the fall, a vegetation study is done. At designated locations along each transect, a sampling of each species and its percent cover, is documented.

C. Expected Results and Benefits

The information produced will be used to determine trends and to keep hunters informed on the progress of hunts. The data will be used to design and implement a program to provide hunters the information on game mammal harvest density trends over the years. Aerial surveys will allow for the Division to monitor population trends/densities, reproductive success and animal movements. Information gathered will be used to insure proper game management for the future. Monitoring of seven (7) transects will determine the impacts hunting has on the control of feral ungulates and their associated disturbances on watersheds.

D. Approach

- Fourteen (14) hunter check stations will be operated on a self-checking basis within the district to gather hunter harvest data. Each check station will be checked once or twice a week to pick up completed check sheet forms and replace with new ones. Telephone and mail hunter interviews will augment checking station data collection.
- Annual aerial surveys will be conducted once a year over PHA's on Molokai and Maui to

monitor habitat conditions and population trends/densities of game mammals. On Maui, transects separated by ½ mile are flown. A projection index was developed and is currently used to determine population estimates. On Molokai, due to the dense canopy, no projection indexes have been developed and gulches are used instead of transects separated by ½ mile. No overall population estimates are given for Molokai.

- Monitor seven (7) transects, 500 meters long, located within the Makawao and Koolau Forest Reserves. Each spring and fall, data collected along predetermined points along these transects will be recorded. Data includes scat, digging, etc. from feral pigs. A vegetation study will be conducted every two years during the fall to determine the change in vegetation makeup within the forest reserves. Points for this vegetative study are located within the seven (7) transects. An assessment will be determined as to the impacts public hunting has on the control of feral pig numbers and their associated disturbance to watersheds.

E. Location

Public hunting areas on the islands of Maui and

Project 28 W-28-GS-04 Game Surveys and Inventories (Game Mammal): Honolulu County.

A. Need

Data on the status and trends of game mammal populations and the condition of their habitats are needed to manage these populations effectively and to maximize recreational hunting opportunities, while assuring compatibility with other forest and wildlife management objectives. Information on hunter effort and success is needed to assess game mammal population trends. Habitat surveys are needed to assess game mammal habitat conditions, the status of watershed quality and condition, and the effects these introduced animals may be having on native vegetation communities. Management of control hunts in areas that are not designated PHAs are based on ungulate disturbances, nuisance complaints, and native species protection. The control hunts are managed to reduce the number ungulates in the areas.

B. Objectives

- Hunter participation and game harvest information will be collected on a monthly basis from 12 hunter check-in stations Effort and success data will also be collected by surveying individual hunters in the field or over the phone, and by working with the local hunters associations and clubs. This information will be used to manage needs of game program, identify areas of improvements, and obtain overall usage of Hunting Areas.
- Aerial surveys will be conducted to obtain trends in populations of feral goats where they are found on the Island. They will be conducted via elevation transects in the Makua-Keaau and Waianae Kai PHAs. Control hunt data will determine the conditions and stipulations of permits issued to ensure that ungulates are being controlled. Control will be based on decreasing hunter effort/catch. A downward trend will indicate a reduction in populations. Permits and access will be issued relative to this data.

C. Expected Results and Benefits

Information collected on hunter effort and success will be used to assess game mammal population trends and will provide data on which to base recommendations for hunting seasons, which maximize hunting recreation opportunities while ensuring protection of watersheds and native vegetation.

Habitat survey results will be used to assess game mammal habitat, quantify the status of watershed conditions in public hunting areas, and the measure the effects that game animals may be having on native vegetation communities.

D. Approach

- Determine hunter participation and hunter success in 14 PHA's and one GMA on Oahu by data from each area (12x/year)
- Monitor range conditions of feral pigs and goats via aerial surveys (3x/year) at Makua Keeau and Waianae Kai PHA.
- Determine hunter success for permits for the Honolulu Forest Reserve, Moanalua Section, Manoa Tantalus section and the Waimanalo Forest Reserve (12x/year)

E. Location

Public Hunting Areas and Forest Reserves on Oahu

Project 29 W-28-GS-05 Game Surveys and Inventories (Game Mammal): Kauai County

A. Need

Measurement of game mammal population trends, habitat conditions and the levels of hunting pressure are needed to effectively manage the game resources for sustained yield hunting where it is appropriate, and to protect native ecosystems. Measurements of hunting pressure, in terms of hunter trips made, total game killed, and hunter success are needed to gauge the effectiveness of the public hunting program for supplying the demand for recreational hunting on those lands designated for sustained yield hunting, and to protect native flora, fauna and their habitats from damage caused by feral ungulates in areas designated for native ecosystem protection. Without the collection of this information, rational game mammal management decisions cannot be made that will provide for the greatest hunting opportunities while protecting natural resources in areas designated for that purpose.

B. Objectives

- Measure the population status and trends of feral pigs, feral goats and black-tailed deer on areas under the control and management of DOFAW, to assure maximum recreational opportunity where it is appropriate, and to minimize animal damage to intact native ecosystems where they occur.
- Measure the conditions and trends of feral pig, feral goat and black-tailed deer on Kauai's public lands to protect sustained yield game habitat from being over-used, and to protect native ecosystems from damage. Collect and analyze the levels of hunting pressure, harvest of feral pigs, feral goats and black-tailed deer on Kauai's public hunting lands as a measure of the success of recreational hunting program, and to identify areas in need of intensified hunting pressure for the protection of rare native species and their habitats.
- Analyze the data collected for use in making recommendations for hunting seasons and bag limits to ensure maximum recreational benefits are realized in appropriate areas, while providing for the protection of native ecosystems and threatened and endangered flora and fauna in other areas.

C. Expected Results and Benefits

The information collected will provide the necessary information on which to base recommendations for game mammal hunting seasons, bag limits, days, and means of take. It will enable DOFAW to attain the maximum recreational benefit in those lands designated for sustained yield hunting, and protect to the greatest degree possible, through the use of liberal hunting regulations, those areas that have significant native resources that need protection. The information collected will be used to monitor long term habitat conditions trends that will be useful for addressing long term actions and priorities in ecosystem management.

Feral goat populations in Waimea Canyon and the Na Pali Coast will be surveyed during the spring months using the previously established helicopter contours method. Black-tailed deer and feral pig population estimates and densities will be assessed by analyzing the results of the annual browse survey transects, and through evaluation of hunter success ratios in the annual hunting season results.

D. Approach

- Nineteen hunter checking stations will be maintained throughout game mammal hunting seasons, to collect information on total number of hunter trips made, and numbers and species of game mammals taken in each hunting unit.
- Habitat conditions of feral goats, black-tailed deer and feral pig transects will be monitored at the previously established game range exclosure in the State Forest Reserves, Game Management Areas, State Parks, and NARS lands open to hunting.
- Previously established game range survey transects using the modified Aldous browse survey method will be used to determine the coverage and use of key browse species, as well as the encroachment of new alien weed species.
- Established photo stations will be re-visited and re- photographed to record long term and broad scale vegetation changes that are not necessarily related to animal impacts.
- Twelve transects (pig and deer) were destroyed by the 2012 Kokee fires and by the establishment of new fire breaks. New transects will need to be established to make up for the losses. The remaining eight transects will be monitored annually.
- Goat surveys will be conducted annually in Waimea Canyon and Na Pali coast using a combination of ground and aerial censuses.
- Recommendations will be made for hunting season and bag limit changes where necessary to maximize recreational hunting opportunity in those lands zoned for sustained yield hunting, or to minimize habitat damage in those areas zoned for protection of native ecosystems and threatened and rare plants.

E. Location
Island of Kauai

Project 30 W-28-GS-01Game Surveys and Inventories: Hawaii County (Game Bird) -East Hawaii District

A. Need

Data on the status and trends of game bird populations and the condition of the habitats in which they are found are needed to manage these populations effectively and to maximize recreational hunting opportunities. Analysis of hunting effort and success and population survey data will provide information on species distribution and abundance, habitat trends in game bird hunting areas and the effectiveness of habitat management programs. There is also a need to monitor diseases and seek ways to accommodate bird hunting and nene restoration in the same areas to accomplish multi-resource management.

B. Objectives

- Determine the status and distribution, population densities, reproductive success, status, and trends of game birds and in East Hawaii.
- Monitor habitat conditions.
- Determine hunter pressure and success.
- Survey new areas as possible candidates for additional PHA's.
- Monitor diseases and parasitism.

C. Expected Results and Benefits

The data collected at hunter checking stations, along with information from previous years, will provide a basis for management, development, and maintenance actions.

D. Approach

- Quantitative data on game bird populations, distributions, reproductive success, and hunter effort and success will be obtained from surveys and hunter checking stations.
- Surveys may incorporate the use of aerial surveys, ground based strip-transect routes, call counts, and telephone surveys
- Collection of game birds for crop analysis in conjunction with vegetation surveys during various seasons can give the Division insight in game birds foraging behavior.
- Other lands with a potential for eventual incorporation into public hunting will be surveyed and pursued.

E. Location of Work

Island of Hawaii, East Hawaii District

Project 31 W-28-GS-02 Game Surveys and Inventories (Game Bird): Hawaii County -West Hawaii District

A. Need

Data on the status and trends of game bird populations and the condition of the habitats in which they are found are needed to manage these populations effectively and to maximize recreational hunting opportunities. Analysis of hunting effort and success and population survey data will provide information on species distribution and abundance, habitat trends in game bird hunting areas and the effectiveness of habitat management programs.

B. Objectives

- Monitor the distribution, population densities, reproductive success, foraging behavior, status and trends of game birds in West Hawaii.
- Determine hunter effort and success, and the effects of hunting on game bird distribution and numbers.
- Evaluate the success of implemented habitat improvement and predator control programs on game bird productivity and hunter success.
- Assess the effects of limiting factors, including disease, parasitism, predation, and weather, on the distribution density and reproductive success of game birds and on their habitats.

C. Expected Results and Benefits

The surveys proposed will provide the basis to formulate and design new management programs that eventually lead to improved public hunting opportunities. Data produced from surveys will aid in the evaluation of management practices and techniques, and enable us to identify potential lands suitable for use as game bird hunting areas. Data obtained will be combined with information gathered in previous years for use in making wildlife management decisions.

D. Approach

- Roadside and aerial surveys will be conducted 1-2x per year at Mauna Kea FR, Puu Waawaa FR and Puu Anahulu GMA and other PHAs for range and distribution of game birds. Quantitative data hunter effort and success will be obtained from surveys and hunter checking stations and reported annually. Other lands with a potential for eventual incorporation into public hunting will be surveyed and pursued.

E. Location of Work

Island of Hawaii, West Hawaii District

Project 32 W-28-GS-03 Game Surveys and Inventories (Game Bird): Maui

A. Need

Data on the status and trends of game bird populations and the condition of the habitats in which they are found are needed to manage these populations effectively and to maximize recreational hunting opportunities. Analysis of hunting effort and success and population survey data will provide information on species distribution and abundance, habitat trends in game bird hunting areas and the effectiveness of habitat management programs.

B. Objectives

- Monitor the distribution, population densities, reproduction success, status and trends of game birds in the County of Maui-Maui, Lanai and Molokai.
- Determine hunter effort and success, and the effects of hunting on game bird distribution and numbers.
- Evaluate the success of habitat improvements in improving game bird productivity and hunter success.
- Assess the effects of human activities and land uses on game bird distribution and reproductive success in terms of alterations to their habits and habitats.
- Determine the effects of limiting factors, such as disease, parasitism, predation and weather, on the distribution, density, and reproductive success of game birds and their habitats.
- Pre-Hunt game bird survey for the Lanai Cooperative Game Management Area

C. Expected Results and Benefits

The gathering, interpretation, evaluation, and reporting of the information will provide a basis for game bird management, development, maintenance and proposals for research programs involving game birds and their habitats within Maui County, and to make recommendations concerning compatible and non-compatible uses within the public game bird hunting areas.

Game bird survey information will be used to evaluate efficacy of previous management practices and hunting seasons. This information will form the basis for the design and implementation of new management programs and public hunting season regulations. It will be utilized to seek out new areas for game management. Studies of the causes of decreasing game bird productivity will provide answers for management and the means for reversing such trends. Data obtained will be combined with information gathered in previous years for use in making wildlife management decisions.

Survey information will be used to identify potential land suitable for use as game bird hunting areas, and development of additional lands for the purpose of public hunting to will be explored.

D. Approach

- Hunter check stations on Maui, Molokai, and Lanai are run on a self-check basis throughout the game bird season to the collect harvest data. Hunters are required to fill out and complete game bird harvest forms for each day hunted.
- Check stations are monitored twice a week, completed forms collected and replaced by new ones, throughout the game bird season. Hunt results are used to determine the status of game bird populations by looking at effort per game bird harvested. These results can be compared to previous game bird season data. Distribution maps will be maintained to show current range of established game birds.
- Game bird population densities, distribution, and brood survival will be monitored to assess

population status and trends. Roadside game bird surveys are conducted on a monthly basis within many of Maui Nui's public hunting areas. Data is used to determine reproductive success, survivorship, and pre/post game bird population status. On Maui and Lanai, a pre-game bird survey is conducted during the months of September/October. Established transects, guided by a GPS to maintain consistency year over year, are walked prior to the start of the game bird season. This data will be used to determine population numbers (reproductive success/survivorship) prior to the season. By comparing previous year surveys, trends can develop showing the status of game bird populations.

- Game bird habitats on public hunting areas and potential public game bird hunting areas will be surveyed to determine the effect of the environment and hunter activities on game bird production and hunting. The value of habitat improvements within public hunting areas in Maui County will be assessed and utilized in planning further improve and/or develop projects. A baseline survey will be conducted, followed by annual surveys using same methodology. Based on these results, it can be determined whether improvements to game bird habitats have been beneficial. Brood survival and game bird densities will be correlated with rainfall within game management areas. Reports with recommendations for management programs and habitat development will be prepared annually.

E. Location

Public hunting areas on the islands of Maui, Molokai and Lanai.

Project 33 W-28-GS-04 Game Surveys and Inventories (Game Bird): Honolulu County.

A. Need

Data on the status and trends of game bird populations and the condition of the habitats in which they are found are needed to manage these populations effectively and to maximize recreational hunting opportunities. Analysis of hunting effort and success and population survey data will provide information on species distribution and abundance, habitat trends in game bird hunting areas and the effectiveness of habitat management programs.

B. Objectives

- Game birds will be surveyed by line transect methods and mapping of individual birds. The surveys will be conducted on three miles of roads in the Kuaokala GMA and Makua Keaau PHA.
- Hunter effort and success in the Kuaokala GMA and the Mokuleia and Makua Keaau PHA's will be determined using check in data.
- Hunter participation and game bird harvest information will be collected during the game bird season (Nov- Jan).
- Effort and success data will also be collected by surveying individual hunters in the field or over the phone, and by working with the local hunters associations and clubs.
- Checking station data will be analyzed to determine hunter effort and success.
- Habitat assessments will be made based on vegetation type and condition.

C. Expected Results and Benefits

The surveys will provide data on game bird population distribution, trends, and limiting factors, which can be used as a basis for wildlife management actions. Habitat survey results will be used regulate hunter pressure on game bird populations.

D. Approach

- Monitor game bird distribution and abundance in public hunting and game management areas on Oahu (2x/year).
- Determine hunter effort and success in the Kuaokala GMA and Mokuleia and Makua Keaau PHA's by analyzing check station data (12x/year).
- Survey and interview hunters for information and feedback on hunting conditions (16x/year)

E. Location

Kuaokala, Mokuleia and Makua Keaau PHA's, Oahu

Project 34 W-28-GS-05: Game Bird Surveys and Inventories (Game Bird): Kauai County

A. Need

The monitoring of game bird populations, their habitats, and levels of hunting pressure are needed to effectively manage the resources for maximum public benefit. Measurements of hunting pressure, in terms of hunter trips made, and hunter success ratios are needed to measure the effectiveness of recent habitat improvements and management actions. An additional 6,000 acres of public hunting lands were obtained in 2001, which have increased management needs. Investigation into the cause of poor game bird productivity needs to be continued. Although the stage in the game bird life cycle where losses are occurring has been determined, the specific cause(s) have not.

B. Objectives

- Measure the status of game bird populations, the levels of hunting pressure, and the numbers of game birds harvested on Kauai's PHA's.
- Determine the cause of small clutch sizes, low hatchability and poor chick survival of pheasants and francolins in public hunting areas

C. Expected Results and Benefits.

The information collected will measure the effectiveness of habitat development projects and hunting season management in meeting our annual harvest goal of 1.0 game bird per hunter trip in Kauai public hunting areas. Finding the cause of game bird productivity problems may lead to management actions that can reverse the downward trend. Survey results will be analyzed and used to make game bird management recommendations.

D. Approach.

- Nine hunter checking stations will be maintained throughout the game bird hunting season to collect information on total hunter trips made, hours hunted, and the numbers and species of game birds taken in each area. Data will be analyzed to measure hunting pressure, hunter success, and species composition for each area.
- Pre-hunting season surveys will be made in game management areas with volunteers and their bird dogs to determine relative game bird availability. Ten -two member teams using volunteer hunters with trained game bird dog traverse a designated area and count the number of game bird species visually flushed during a two hour morning survey. The survey is repeated in the late afternoon for two hours. Results are analyzed for comparison from the previous year. Hunting season recommendations and habitat management decisions will be based upon the results of those surveys.
- Up to three wild caught francolin pairs will be captured and maintained in captivity to compare their clutch sizes and hatching success with what has been found in the wild. An attempt to confirm the cause of low hatchability, and poor chick survival will be made by identifying whether it is nutrition, disease, or habitat quality that is causing low productivity.

E. Location

Kekaha, Puu Ka Pele, Mokihana Ridge, and Wailua GMA's on the island of Kauai

Budget Activities

W-22-GC-1 State of Hawaii Game Planning and Coordination							
		FY12	FY13	FY14	FY15	FY16	5-yr. Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Review record, reports & procedures	daily, as needed	daily, as needed	daily, as needed	daily, as needed	daily, as needed	
	Coordinate & assist with Statewide Audit	2 / yr, Jan -March	2 / yr, Jan -March	2 / yr, Jan -March	2 / yr, Jan -March	2 / yr, Jan -March	
	Prepare & compile annual grant agreement and report	1/yr; An. Rpt-Sept; Grant Agr.	1/yr; An. Rpt-Sept; Grant Agr	1/yr; An. Rpt-Sept; Grant Agr	1/yr; An. Rpt-Sept; Grant Agr	1/yr; An. Rpt-Sept; Grant Agr	
	Prepare 5 year Grant Proposal Package	-	-	-	-	1	
	Statewide Federal Aid Staff Meeting	2/yr	2/yr	2/yr	2/yr	2/yr	
	R1 Coordinator Mtg	1/yr	1/yr	1/yr	1/yr	1/yr	
	WAFWA & IAFWA Meetings	2/yr	2/yr	2/yr	2/yr	2/yr	
	Annual Site Visits to each District	1/yr	1/yr	1/yr	1/yr	1/yr	
	Purchase of 4wd Motor Vehicle	5	-	-	1	-	
	IAFWA Meeting	1/yr	1/yr	1/yr	1/yr	1/yr	
	Game Management Plan: draft, review, revise	Weekly as needed	-	-	-	1	
	Access and acquisitions	daily	daily				
	Online Hunting License and Permit			7 units deployment	Reg. Maint. Devlop.		

	Development, Kiosks						
	VPC Conference (Kone, 3/14 Game PR Staff			10 Staff 1/yr			
	Hawaii Conservation Conference			10 Staff 1/yr	10 Staff 1/yr	10 Staff 1/yr	

Game Coordination Totals						
Annual Totals	$556,250	$125,000	$212,500	$212,500	$250,500	$800,500
Salary (A)	$111,250.00	$25,000.00	$42,500.00	$116,000	$150,000	$333,500
Operating (B)	$445,000	$100,000	$170,000	$96,000	$100,000	$466,000

W-23-GL Statewide Game Land Access and Acquisition								
		FY12	FY13	FY14	FY15	FY16		5Year Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Est. Cost	
1	Pay for Kipuka Aina Hou Lease	15,426 acre/ year	15,426.9 ac/yr	15,426.9 ac/yr	15,426.9 ac/yr	15,426.9 ac/yr *(through October 2016)*	$36,000	
2	Pay for Kaonoulu Ranch lease	940 acres/yr	940 acres/yr	940 acres/yr	940 acres/yr	940 acres/yr	$2,600	
3	Land Rental	1,000 acs/ yr	1,000 acs/ yr	1,000 acs/ yr	1,000 acs/ yr	30,000 acs/ yr (Lanai March 2016-2017)	$5,000	
4	Land Negotiation	1/ yr	1/ yr	1/ yr	1/ yr	1/ yr		
5	Create new access agreements and leases	As needed	As needed	As needed	As needed	As needed	$5,000	
6	Renewal of existing leases and access agreements	As needed	As needed	As needed	As needed	As needed	$5,000	
7	Information gathering to identify access/acquisition	Daily	Daily	Daily	Daily	Daily (*PA 20-21)*	$2,000	
8	Acquire fee title or conservation easements	As needed	As needed	As needed	As needed	As needed	*submit separate funding proposals for each acquisition*	
9	Conduct Environmental compliance	As needed	As needed	As needed	As needed	As needed	$15,000	
10	Prepare EA for Kanaio Game Management Area (Maui)			1 x /year			$200,000	
11	Conduct Botanical and other			1 x /year				

	surveys for Kanaio GMA							
12	Prepare EA for Keamuku GMA			1 x /year			Dropped	
13	Proposal writing and grant management	As needed	As needed	As needed	As needed	As needed (*PA 20-21)*		
14	Conduct on-the-ground coordination with Landowners	Daily	Daily	Daily	Daily	Daily	$2,000	
15	Conduct on-the-ground project implementation	As needed	As needed	As needed	As needed	As needed *(PA 16-19)*		
16	Create access corridor to Kalaheo section Lihue via *Puulima Place and Kua Road*			1 x /year		2	$100,000	
17	Create access corridor to Hilo Forest Reserve via *Makahanaloa mauka*			1 x /year		1	$2,000	
18	Conduct survey for access to Hilo Forest Reserve via *Makahanaloa makai*			1 x /year			$5,000	
19	Conduct survey for access to Ka'u Forest Reserve via *Department of Agriculture route*			1 x /year			$15,000	
20	Access and Acquisition Coordination (100%FTE)			1	1	1	$70,064	
21	Access and Acquisition Assistant (60%FTE)			1	1	1	$24,678	

Game Land Access and Acquisition Totals						
Total Cost/ Year	$20,336	$20,336	312,500	$218,750	$630,000	$1,201,992
Salary (A)	$4,067.25	$4,067.25	$62,500.00	$74,000.00	$183,400	$328,034

Operation (B)	$16,269	$16,269	$250,000	$144,000	$446,600	$872,538

W-29-GR-01 Game Mammal Research Accurately Estimate Sheep and Goat Survival Rates, Population Demographics and Habitat Use in the Puu Waawaa Forest Reserve and Puu Anahulu GMA: West Hawaii							
		FY12	FY13	FY14	FY15	FY16	5 year total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Develop & revise research proposal	1/yr; May	1/yr; May	-	-	-	
2	Issuance of Contract	1/yr; July	1/yr; July	-	-	-	
3	Coordination with field work & monitoring contract	2/month	2/month	-	-	-	
4	Conduct mail survey	1/island	1/island	-	-	-	
5	Conduct pilot phone survey	1/island	1/island	-	-	-	
6	Publish Results	-	-	1	-	-	
	Annual Totals	$56,250	$56,250	$3,750	$0	$200,000	$260,000
	Salary (A)	$11,250.00	$11,250.00	$750.00	$0.00	69,000	$115,500
	Operating (B)	$45,000	$45,000	$3,000	$0	$131,150	$224,150

W-29-GR-2 Game Mammal Research Determine Overall Genetic Diversity of Muflon Sheep within the Lanai Cooperative Game Management Area: Maui County							
		FY12	FY13	FY14	Fy15	Fy16	5 Year Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Develop & revise research proposals	-	-	-	1/yr; May	1/yr; May	
2	Issuance of Contract	-	-	-	1/yr; July	1/yr; July	
3	Coordination with field work & monitoring research	-	-	-	1/month	1/month	
4	Salary Survey Biologist	-	-	-	1	1	
5	InterIsland Travel	-	-	-	2/Qtr	2/Qtr	
6	Game Cameras	-	-	-	10--20	10--20	
7	Office Space and Field Gear	-	-	-			
	Annual Totals	$0	$0	$0	$165,000	$151,978	$455,933
	Salary (A)	$0	$0	$0	$84000	$30,395.50	$91,187
	Operating (B)	$0	$0	$0	$80,000	$121,582	$364,746

Game Research Totals							
	FY12	FY13	FY14	FY15	FY16	5-yr. Total	
Total Cost / Year	$56,250	$56,250	$155,728	177,000	$151,978	$572,183	Total Cost / Year
Salary (A):	$11,250.00	$11,250.00	$31,145.50	$90,000	$30,395.50	$114,437	Salary (A):
Operation (B):	$45,000	$45,000	$124,582	$86,000	$121,582	$457,746	Operation (B):

W-24-GO-01 Game Operations and Maintenance: Hawaii County - East Hawaii District							
		FY12	FY13	FY14	FY15	FY16	5-yr. Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Maintain hunter check stations	3/mo	3/mo	3/mo	3/mo	3/mo	
2	Sign and marker upkeep	150/yr	150/yr	150/yr	150/yr	150/yr	
3	Game waterunit maintenance	11/yr	11/yr	11/yr	11/yr	11/yr	
4	Maintenance of self-check stations	9/mo	9/mo	9/mo	9/mo	9/mo	
5	Boundary fence maintenance	5 mi/yr	5 mi/yr	5 mi/yr	5 mi/yr	5 mi/yr	
6	Roadside brushing and upkeep						
7	Motor Vehicle Purchase (4wdr Hvy Duty Truck)	1	1	1	-	-	
	Total Cost/Year	$100,000	$112,500	$112,500	$86,250	$95,000	$506,250
	Salary (A):	$20,000.00	$22,500.00	$22,500.00	$60,000	$65,000	$190,000
	Operation (B):	$80,000	$90,000	$90,000	$26,000	$30,000	$316,000

W-25-GP -01 Game Population Management Hawaii County East Hawaii District						
	FY12	FY13	FY14	FY15	FY16	5-yr. Total
Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
Predator Control	20 traplines/mo	20 traplines/mo	20 traplines/mo	20 traplines/mo	20 traplines/mo	
Total Cost/Year	$43,750	$43,750	$43,750	$68,750	$75,000	$398250
Salary (A):	$8,750.00	$8,750.00	$8,750.00	$47,000	$50,000	$123,250
Operation (B):	$35,000	$35,000	$35,000	$21,000	$25,000	$151,000

W-26-GH-01 Game Habitat Management: Hawaii County - East Hawaii District							
		FY12	FY13	FY14	FY15	FY16	5-yr. Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Habitat restoration	100 acres/yr	100 acres/yr	70 acres/yr	70 acres/yr	70 acres/yr	
	Total Cost/Year	$37,500	$37,500	$37,500	$87,500	$96,000	$296,000
	Salary (A):	$7,500.00	$7,500.00	$7,500.00	$67,000.00	$76,000	$165,500
	Operation (B):	$30,000	$30,000	$30,000	$20,000	$20,000	$130,000

W-27-GF-01 Game Facilities Construction Hawaii County - East Hawaii District							
		FY12	FY13	FY14	FY15	FY16	5-yr. Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Game Bird Waterunits	1/yr	1/yr	1/yr	1/yr	1/yr	
2	Check Stations	1/yr	1/yr	1/yr	2/yr	-	
3	Sign and Marker Placement	200/yr	200/yr	200/yr	200/yr	200/yr	
4	Repair baseyard roof (10%share)	1	-	-	-	-	
	Total Cost/Year	$62,500	$37,500	$37,500	$87,500	$90,000	$285,000
	Salary (A):	$12,500.00	$7,500.00	$7,500.00	$42,000	$47,000	$116,500
	Operation (B):	$50,000	$30,000	$30,000	$40,000	$43,000	$193,000

W-28-GS-01 Game Surveys and Inventories (Game Mammal): Hawaii County - East Hawaii District							
		FY12	FY13	FY14	FY15	FY16	5-yr. Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Aerial Survey Comprehensive	12hrs/yr	12hrs/yr	08hrs/yr	08hrs/yr	08hrs/yr	
2	Pig Study (nos.& habitat use)	4 x/yr	4 x/yr	4 x/yr	4 x/yr	4 x/yr	
3	Evaluate Hunter Use	12 day/mo	12 day/mo	12 day/mo	12 day/mo	12 day/mo	
	Total Cost/Year	$30,000	$30,000	$30,000	$50,000	$55,000	$195,000
	Salary (A):	$6,000.00	$6,000.00	$6,000.00	$36,000	$39,000	$93,000
	Operation (B):	$24,000	$24,000	$24,000	$14,000	$16,000	$102,000

W-28-GS-01Game Surveys and Inventories: Hawaii County (Game Bird) - East Hawaii District							
		FY12	FY13	FY14	FY15	FY16	5-yr. Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Field Surveys	3mo/yr	3mo/yr	3mo/yr	3mo/yr	3mo/yr	
2	Vet diagnosis	3x/yr	3x/yr	3x/yr	3x/yr	3x/yr	
3	Collect and analyze hunting data	2 wks/yr	2 wks/yr	2 wks/yr	2 wks/yr	2 wks/yr	
4	Expanded hunting area appraisal	2 days/mo	2 days/mo	2 days/mo	2 days/mo	2 days/mo	
	Total Cost/Year	$15,000	$15,000	$15,000	$35,000	$38,000	$118,000
	Salary (A):	3,000.00	3,000.00	3,000.00	$28,000	$31,000	$71,000
	Operation (B):	$12,000	$12,000	$12,000	$7,000	$7,,000	$50,000

Hawaii County, East Hawaii District Totals						
	FY12	FY13	FY14	FY15	FY16	5-yr. Total
Total Cost/Year	$288,750	$276,250	$276,250	$415,000	$449,000	$1,705,250
Salary (A):	$57,750	$55,250	$55,250	$281,163	$308,000	$757,413
Operation (B):	$231,000	$221,000	$221,000	$133,963	$141,000	$947, 963

W-24-GO-02 Game Operations and Maintenance Hawaii County - West Hawaii District							
		FY12	FY13	FY14	FY15	FY16	5-yr. Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Hunter check station and support bldg. maintenance	3/yr	3/yr	8/yr	8/yr r	8/yr	
2	Sign and marker upkeep	300/yr	300/yr	300/yr	300/yr	300/yr	
3	Game bird guzzler & feeder maintenance	60/yr	60/yr	60/yr	60/yr	60/yr	
4	Self-check station maintenance	5/mo	5/mo	5/mo	5/mo	5/mo	
5	Boundary fence maintenance	2 mi/yr	2 mi/yr	2 mi/yr	4 mi/yr	2 mi/yr	
6	Roadside mowing and upkeep:	30 mi/yr	30 mi/yr	65 mi/yr	75 mi/yr	65 mi/yr	
7	Waterline maintenance	5 mi/mo	5 mi/mo	7 mi/mo	7 mi/mo	7 mi/mo	
8	Exclosure maintenance	2/yr	2/yr	5/yr	7/yr	5/yr	
9	Motor Vehicle Purchase (4wdr Hvy Duty Truck)	1	-	4	1	-	
10	Purchase tractor (1/2 share)	1	-	-	-	-	
	Total Cost / Year	$143,750	$100,000	$400,000	$225,000	$350,000	$1,218,750
	Salary (A):	$28,750.00	$20,000.00	$80,000.00	$90,000	$174,000	$392,750
	Operation (B):	$115,000	$80,000	$320,000	$135,000	$176,000	$826,000

W-25-GP-02 Game Population Management Hawaii County – West Hawaii District							
		FY12	FY13	FY14	FY15	FY16	**5-year Total**
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Trap for feral cat/mongoose	100x/yr	100x/yr	100x/yr	150x/yr	100x/yr	
2	Trap for feral dogs	2x/wk	2x/wk	2x/wk	2x/wk	2x/wk	
3	Game supplements	100 blocks/100 hay bales/yr	100 blocks/100 hay bales/yr	100 blocks/100 hay bales/yr	100 blocks/100 hay bales/yr	100 blocks/100 hay bales/yr	
4	Salvage operations	-	-	Up to 12/yr	Up to 12/yr	Up to 12/yr	
	Total Cost / Year	$50,000	$50,000	$175,000	$225,000	$150,000	$650,000
	Salary (A):	$10,000.00	$10,000	$35,000	$114,000	$58,550	$227550
	Operation (B):	$40,000	$40,000	$140,000	$111,000	$91,450	$500,000

W-26-GH Game Habitat Management : Hawaii County - West Hawaii							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Plant tree seedlings	2500/yr	2500/yr	3500/yr	2500/yr	2500/yr	
2	Collect seed for propagation	1day/mo	1day/mo	2day/mo	1day/mo	1day/mo	
3	Strip mowing	4 wk/yr	4 wk/yr	5 wk/yr	4 wk/yr	4 wk/yr	
4	Upgrade/ build planting exclosures	-	-	6ac/yr	4ac/yr	4ac/yr	
5	Create game bird habitat	-	-	4ac/yr	2ac/yr	2ac/yr	
6	Create game food plots	-	-	2ac/yr	2ac/yr	2ac/yr	
	Total Cost / Year	$25,000	$25,000	$118,750	$87,500	$120,000	$376,250
	Salary (A):	$5,000	$5,000	$15,766	$50,000	$59,350	$135.116
	Salary (B):	$20,000	$20,000	$102,984	$37,000	$60,650	$240,634

W-27-GF-02 Game Facility Construction Hawaii County – West Hawaii District							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Install waterline	2mi/yr	2mi/yr	2mi/yr	4mi/yr	2mi/yr	
2	Install game bird guzzlers of waterline	10/yr	10/yr	10/yr	10/yr	10/yr	
3	Game bird guzzler construction	4/yr	4/yr	4/yr	4/yr	4/yr	
4	Install informational sings	2/yr	2/yr	2/yr	5/yr	2/yr	
5	Repair base yard facility	-	-	1	1	2ac/yr	
	Total Cost / Year	$12,500	$12,500	$50,000	$56,250	$56,250	$187,500
	Salary (A):	$2,500	$2,500	$10,000	$41,750	$41,750	$98,500
	Salary (B):	$10,000	$10,000	$40,000	$14,500	$14,500	$89,000

W-28-GS-02 Game Surveys and Inventories (Game Mammals): Hawaii County - West Hawaii District							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Aerial survey	12hrs/yr	12hrs/yr	12hrs/yr	12hrs/yr	12hrs/yr	
2	Collect date at hunter check stations	28 days/yr	28 days/yr	28 days/yr	28 days/yr	28 days/yr	
3	Veg. Impact survey	3 wks/yr	3 wks/yr	3 wks/yr	3 wks/yr	3 wks/yr	
4	Distribution/ movement monitoring	12 days/yr	12 days/yr	12 days/yr	12 days/yr	12 days/yr	
5	Analyze hunter data	1 week/yr	1 week/yr	1 week/yr	1 week/yr	1 week/yr	
	Total Cost / Year	$43,750	$43,750	$56,250	$50,000	$56,250	$256,250
	Salary (A):	$8,750	$8,750	$11,250	$23,000	$11,250	$51,250
	Salary (B):	$35,000	$35,000	$45,000	$27,000	$45,000	$205,000

W-28-GS-02 Game Surveys and Inventories (Game Bird): Hawaii County - West Hawaii District							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Aerial survey	6 hrs/yr	6 hrs/yr	6 hrs/yr	6 hrs/yr	6 hrs/yr	
2	Collect date at hunter check stations	28 days/yr	28 days/yr	28 days/yr	28 days/yr	28 days/yr	
3	Ground transect surveys	10 d/yr	10 d/yr	10 d/yr	10 d/yr	10 d/yr	
4	Call count surveys	5 d/yr	5 d/yr	5 d/yr	5 d/yr	5 d/yr	
5	Game bird recruitment survey	5 d/yr	5 d/yr	5 d/yr	5 d/yr	5 d/yr	
6	Analyze hunter date	2wks/yr	2wks/yr	2wks/yr	2wks/yr	2wks/yr	
	Total Cost / Year	$25,000	$25,000	$25,000	$25,000	$36,000	$1476,000
	Salary (A):	$5,000	$5,000	$5,000	$13,469	$11,950	$51,950
	Salary (B):	$20,000	$20,000	$20,000	$11,531	$24,050	$95,581

Hawaii County, West Hawaii District Totals

	FY12	FY13	FY14	FY15	FY16	5-yr. Total
Total Cost / Year	$300,000	$256,250	$750,000	$705,250	$497450	$2,508,950
Salary (A):	$60,000	$51,250	$150,000	$335,000	$96,250	$692,500
Operation (B):	$240,000	$205,000	$600,000	$369,000	$401,200	$1,815,200

W-24-GO-03 Game Operations and Maintenance- Maui County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Maintain Hunter Check Station	3 / mo @ 1x per week	3 / mo @ 1x per week	3 / mo @ 1x per week	3 / mo @ 1x per week	3 / mo @ 1x per week	
2	Sign and marker upkeep	50 / yr	50 / yr	50 / yr @ 2x per month	50 / yr @ 2x per month	50 / yr @ 2x per month	
3	Game water unit maintenance	12 /yr	12 /yr	13 /yr @ 1x per month	13 /yr @ 1x per month	13 /yr @ 1x per month	
4	Maintenance of self-check stations	9 /mo	9 /mo	9/ mo @ 1x per week	9/ mo @ 1x per week	9/ mo @ 1x per week	
5	Boundary fence maintenance	2 mi / yr	2 mi / yr	2 mi / yr	3 mi / yr	2 mi / yr	
6	Roadside brushing and upkeep	2 mi / yr	2 mi / yr	2 mi / yr	2 mi / yr	2 mi / yr	
7	Replacement of access gates	1 /yr	1 /yr	1 /yr	1 /yr	1 /yr	
8	Road maintenance	10 miles/yr	10 miles/yr	10 miles/yr	15miles/yr	10 miles/yr	
9	Purchase 4WD vehicle		1			1/2	
	Total Cost / Year	$12,500	$62,500	$31,250	$133,750	$138,750	$378,750
	Salary (A):	$2,500	$12,500	$6,250	$68,000	$60,750	$150,000
	Salary (B):	$10,000	$50,000	$25,000	$65,000	$78,000	$228,000

Island of Molokai							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Maintain Hunter Check Station	2x per month checked/maintained	2x per month	1x per month checked/maintained	1x per month checked/maintained	1x per month checked/maintained	
2	Sign and marker upkeep	20 / yr	20 / yr	20 signed checked and maintained	20 signed checked and maintained	20 signed checked and maintained	
3	Storage water unit maintenance	6 /mo	7 /mo	7 water units checked and maintained	7 water units checked and maintained	7 water units checked and maintained	
4	Access gate maintenance	3x / yr	3x / yr	3x / yr checked and maintained	3x / yr checked and maintained	3x / yr checked and maintained	
5	Boundary fence maintenance	1 mi / yr	1 mi / yr	1 mi / yr	1 mi / yr	1 mi / yr	
6	Baseyard building maintenance	2/mo	2/mo	2/mo checked and maintained	2/mo checked and maintained	2 mi / yr	
7	Purchase 4WD vehicle	1		1			
	Total Cost / Year	$81,250	$15,000	$46,250	$15,000	$15,000	$172,500
	Salary (A):	$16,250	$3,000	$9,250	$3,000	$3,000	$34,500
	Salary (B):	$65,000	$12,000	$37,000	$12,000	$12,000	$138,000

Island of Lanai							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Maintain Hunter Check Station	1 /mo checked 1 x per month	1 /mo checked1 x per month	1 /mo checked1 x per month	1 /mo checked1 x per month	1 /mo checked1 x per month	
2	Sign and marker upkeep	20/yr @ 2x per month	20 / yr	20/yr @ 2x per month	20/yr @ 2x per month	20 signed checked and maintained	
3	Storage water unit maintenance	5 /mo	6 /mo	6 water units checked and	7 water units checked and	7 water units checked and	

				maintained	maintained	maintained	
4	Roadside brushing and upkeep	2 mi/yr	2 mi/yr	2 mi/yr	2 mi/yr	2 mi/yr	
5	Enclosure fence maintenance	Three (3) enclosures 2 x/ yr	Three (3) enclosures 2 x/ yr	Three (3) enclosures 2 x/ yr	Three (3) enclosures 2 x/ yr	Three (3) enclosures 2 x/ yr	
6	Water line maintenance	5mi / yr	5mi / yr	5mi / yr	5mi / yr	5mi / yr	
7	Building maintenance	2x per month	2x per month	2x per month	2x per month	2x per month	
8	Road Maintenance	5 miles/yr	5 miles/yr	5 miles/yr	5 miles/yr	5 miles/yr	
9	Purchase 4WD vehicle	1	-	-	-	-	
	Total Cost / Year	$62,500	$6,250	$12,500	$15,000	$17,500	$113,750
	Salary (A):	$12,500	$1,250	$2,500	$3,000	$3,500	$22,750
	Salary (B):	$50,000	$5,000	$10,000	$12,000	$14,000	$91,000

Game Operations and Maintenance Total Maui County

	FY12	FY13	FY14	FY15	FY16	5-yr. Total
Total Cost / Year	$156,250	$83,750	$90,000	$133,750	$101,250	$555,000
Salary (A):	$31,250	$16,750	$18,000	$68,000	$20,250	$111,000
Operation (B):	$125,000	$67,000	$72,000	$65,000	$81,000	$444,000

W-25-GP-03 Game Population Management: Maui County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Predator control - Maui	16 / week (February - July)	16 / week (February - July)	16 traps/ week checked daily	25 traps/ week checked daily	16 traps/ week checked daily	
2	Predator control - Lanai	12 / week (February - July	12 / week (February - July	12 traps/ week checked daily	12 traps/ week checked daily	12 traps/ week checked daily	
3	Cat and Mongoose trap purchase	30 / yr		30 / yr		30 / yr	
	Total Cost / Year	$6,875	$1,375	$6,250	$35,000	$35,000	$84,500
	Salary (A):	$1,375	$275.00	$1,250	$32,000	$32,000	$66,900
	Salary (B):	$5,500	$1,100	$5,000	$3,000	$3,000	$17,600

W-26-GP-03 Game Habitat Management Maui County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	30 Acres habitat mowing at Kahakuloa on Maui/ Clearing	2 x / year	2 x / year	2 x / year	2 x / year	2 x / year	
2	500 acres habitat mowing at Unit 3 on Lanai	2 x / year	2 x / year	2 x / year	2 x / year	2 x / year	
3	Construction of 1-2 acres feed plots for game birds within		1 per year	1 per year		1 per year	
4	Purchase Tractor				1 Lanai	1 Maui	
	Total Cost / Year	$12,500	$15,000	$87,500	$107,500	$130,500	$353,000
	Salary (A):	$2,500	$3,000	$17,500	$67,000	$43,000	$133,000
	Salary (B):	$10,000	$12,000	$70,000	$40,000	$87,500	$219,500

W-27-GF-03 Game Facilities Construction: Maui County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Maui game bird water units				1 /yr		
2	Lanai game bird water trough unit		1 /yr	1 /yr		1 /yr	
3	Molokai game bird water unit					1 /yr	
4	Molokai game bird check station				1 /yr		
5	Sign and marker placement	5 /yr	5 /yr	5 /yr	5 /yr	5 /yr	
	Total Cost / Year	$1,875	$10,000	$10,000	$48,750	$48,750	$119,375
	Salary (A):	$375.00	$2,000	$2,000	$19,000	$19,000	$42,375
	Salary (B):	1,500	$8,000	$8,000	$29,000	$29,000	$75,500

W-28-GS-03 Game Surveys and Inventories (Game Mammal): Maui County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Maui Aerial Survey	1x / yr	1x / yr	1x / yr(May)	1x / yr(May)	1x / yr(May)	
2	Molokai Aerial Survey	1x / yr	1x / yr	1x / yr(May)	1x / yr(May)	1x / yr(May)	
3	Maui Transect Study	2x /yr	2x /yr	2x /yr(spring and Fall)	2x /yr(Spring and Fall)	2x /yr(Spring and Fall	
4	Gather & analyze hunter harvest data	1x/wk @ 14 hunting units	1x/wk @ 14 hunting units	1x/wk @ 14 hunting units	1x/wk @ 14 hunting units	1x/wk @ 14 hunting units	
5	Purchase new 4WD vehicle					1 /yr	
	Total Cost / Year	$12,500	$18,750	$31,250	$56,250	$62,250	$1181.00
	Salary (A):	$2,500	$3,750	$6,250	$44,000	$45,500	$102,000
	Salary (B):	$10,000	$15,000	$25,000	$12,000	$20,700	$82,700

W-28-GS-03 Game Surveys and Inventories (Game Bird): Maui County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Bird Surveys	1/mo	1/mo	1/mo	1/mo	1/mo	
2	Collect and analyze hunter harvest data	1x/wk @ 5 hunter stations	1x/wk @ 5 hunter stations	2x/wk @ 5 hunter stations	2x/wk @ 5 hunter stations	2x/wk @ 5 hunter stations	
3	Lanai pre-game bird season survey	Once a year three (3) days	Once a year three (3) days	Once a year three (3) days	Once a year three (3) days	Once a year three (3) days	
4	Purchase new 4-wheel drive vehicle	1 vehicle Lanai					
	Total Cost / Year	$37,500	$9,375	$12,500	$12,500	$12,500	$84,375
	Salary (A):	$7,500	$1,875	$2,500	$6,500	$6,500	$24,875
	Salary (B):	$30,000	$7,500	$10,000	$6,000	$6,000	$59,500

Maui County Totals

	FY12	FY13	FY14	FY15	FY16	5-yr. Total
Total Cost/Year	$227,500	$138,250	$237,500	$390,000	$431,750	$1,425,000
Salary (A):	$45,500	$27,650	$47,500	$241,000	$209,000	$570,650
Operation (B):	$182,000	$110,600	$190,000	$149,000	$222,741	$854,341

W-24-GO-04 Game Operations and Maintenance: Honolulu County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Base yard Support Building Maint.	2/ year	2/ year	2/ year	2/ year	2/ year	
2	Game bird guzzler and feeder maintenance	104/year	104/year	104/year	104/year	104/year	
3	Access road maintenance	80mi/year	80mi/year	80mi/year	80mi/year	80mi/year	
4	Trail maintenance	72mi/year	72mi/year	72mi/year	72mi/year	72mi/year	
5	Boundary fence maintenance	8mi/year	8mi/year	8mi/year	8mi/year	8mi/year	
6	Sign and marker upkeep	600/year	600/year	600/year	600/year	600/year	
7	Waterline maintenance	6mi/year	6mi/year	6mi/year	6mi/year	6mi/year	
8	Maintain hunter check stations	12/year	12/yerar	12/year	12/year	12/year	
9	Purchase new 4WD vehicle	1		1		1	
10	Purchase new UTV's			1	1		
11	Game Biologist			1	1	1	
12	Purchase new water tank/pumps				1		
	Total Cost / Year	$118,750	$62,500	$225,000	$150,000	$170,000	$726,250
	Salary (A):	$23,750	$12,500	$45,000	$77,000	$70,000	$228,250
	Salary (B):	$95,000	$50,000	$180,000	$73,000	$100,000	$498,000

W-25-GP-04 Game Population Management: Honolulu County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Live trap for feral cat/mongoose	60 traps/mo	60 traps/mo	60 traps/mo	60 traps/mo	60 traps/mo	
2	Survey and Trap Feral Dogs	12/month	12/month	12/month	12/month	12/month	
	Total Cost / Year	$50,000	$68,750	$68,750	$68,750	$75,000	$331,250
	Salary (A):	$10,000	$13,750	$13,750	$35,000	$25,000	$97,500
	Salary (B):	$40,000	$55,000	$55,000	$33,000	$50,000	$233,000

W-26-GH-04 Game Habitat Management: Honolulu County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Plant tree seedlings	50/year	50/year	50/year	50/year	50/year	
2	Spread grass seed	500 lbs/year	500 lbs/year	500 lbs/year	500 lbs/year	500 lbs/year	
3	Create game bird habitat	1 ac/year	1 ac/year	1 ac/year	1 ac/year	1 ac/year	
4	Strip mowing	30 ac/ yr	30 ac/ yr	30 ac/ yr	30 ac/ yr	30 ac/ yr	
5	Gamebird Food Plots	.5ac/year	.5ac/year	.5ac/year	.5ac/year	.5ac/year	
6	Purchase Tractor			1	1		
	Total Cost / Year	$37,500	$50,000	$50,000	$150,000	$250,000	$537,000
	Salary (A):	$7,500	$10,000	$10,000	$77,000	$105,000	$209,500
	Salary (B):	$30,000	$40,000	$40,000	$73,000	$145,000	$328,000

W-27-GF-04 Game Facilities Construction: Honolulu County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Hunter check station construct /replacement	1/yr	1/yr	1/yr	1/yr	1/yr	
2	Game bird guzzler construct/ replacement	1/yr	1/yr	1/yr	1/yr	1/yr	
3	Construct shelter Kuaokala GMA			1/yr		1/yr	
	Total Cost / Year	$37,500	$18,750	$25,000	$18,750	$37,750	$137,750
	Salary (A):	$7,500	$3,750	$5,000	$9,000	$16,750	$42,000
	Salary (B):	$30,000	$15,000	$20,000	$9,000	$19,000	$93,000

W-28-GS-04 Game Surveys and Inventories (Game Mammal): Honolulu County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Collect data at hunter check station	16 days/yr	16 days/yr	16 days/yr	16 days/yr	16 days/yr	
2	Aerial surveys	3x/year	3x/year	3x/year	3x/year	3x/year	
3	Monitor data in Control Hunt Areas	12x/year	12x/year	12x/year	12x/year	12x/year	
	Total Cost / Year	$37,500	$18,750	$25,000	$57,500	$65,000	$203,750
	Salary (A):	$7,500	$3,750	$5,000	$9,000	$40,000	$65,250
	Salary (B):	$30,000	$15,000	$20,000	$9,000	$25,000	$99,000

W-28-GS-04 Game Surveys and Inventories (Game Bird): Honolulu County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Gamebird Surveys	6x/year	6x/year	6x/year	6x/year	6x/year	
2	Determine Hunter Effort/Success	12x/year	12x/year	12x/year	12x/year	12x/year	
3	Survey and interview hunters	16x/year	16x/year	16x/year	16x/year	16x/year	
	Total Cost / Year	$31,250	$31,250	$31,250	$31,250	$38,000	$163,000
	Salary (A):	$6,250	$6,250	$6,250	$16,250	$18,000	$53,000
	Salary (B):	$25,000	$25,000	$25,000	$15,000	$20,000	$110,000

Honolulu County Totals

	FY12	FY13	FY14	FY15	FY16	5-yr. Total
Total Cost / Year	$312,500	$268,750	$450,000	$476,000	$633,000	$2,140,250
Salary (A):	$62,500	$53,750	$90,000	$266,000	$273,000	$745,250
Operation (B):	$250,000	$215,000	$360,000	$210,000	$360,000	$1,395,000

W-24-GO-05 Game Operations and Maintenance Kauai County

		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Building maintenance.	2/mo	2/mo	8/mo	8/mo	2/mo	
2	Hunter check station maint.	15/mo	15/mo	15/mo	15/mo	15/mo	
3	Game bird feeding site maintenance	2/week (Apr-Oct)	2/week (Apr-Oct)	2/week (Apr-Oct)	2/week (Apr-Oct)	2/week (Apr-Oct)	
4	Game water unit maintenance	10/month	10/month	20/month	10/month	10/month	
5	Sign maintenance	60/year as needed	60/year as needed	60/year as needed	60/year as needed	60/year as needed	
6	Mowing of Game Habitat	100 acres/year	100 acres/year	100 acres/year	100 acres/year	100 acres/year	
7	Hunting Area Road Maint.	80 mi/year as needed	80 mi/year	80 mi/year	80 mi/year	80 mi/year	
8	Hunting Area Trail Maint.	50 mi/year as needed	50 mi/year	50 mi/year	50 mi/year	50 mi/year	
9	Exclosure fence maintenance	0.1 mi/month as needed	0.1mi/month	0.1mi/month	0.1mi/month	0.1mi/month	
10	Gate/ fence maintenance	0.1mi/month	0.1mi/month	0.1mi/month	0.1mi/month	0.1mi/month	
11	Purcahse UTV			1	1		
12	Purchase new 4WD vehicle	2		1		1	
	Total Cost / Year	$137,500	$43,750	$125,000	$93,750	$175,000	$575,000
	Salary (A):	$27,500	$8,750	$25,000	$71,000	$79,000	$169850
	Salary (B):	$110,000	$35,000	$100,000	$22,000	$96,000	$329,400

W-25-GP-05 Game Population Management: Kauai County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Service diphacinone bait stations	40/ month	40/month	40/month	40/month	40/month	
2	Live trap for feral cat/dog	60 Traps/mo	60 Traps/mo	60 Traps/mo	60 Traps/mo	60 Traps/mo	
	Total Cost / Year	$6,250	$6,250	$131,250	$131,250	$150,000	$425,000
	Salary (A):	$1,250	$1,250	$26,500	$68,000	$85,000	$182,000
	Salary (B):	$5,000	$5,000	$105,000	$63,000	$65,000	$243,000

W-26-GH-05 Game Habitat Management: Kauai County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Clearing, discing, planting with Bahia/Bermuda grass	40acres/yr	40acres/yr	40acres/yr	35acres/yr	40acres/yr	
2	Purchase 1 Tractor Heavy Equipment			1		1	
	Total Cost / Year	$50,000	$50,000	$125,000	$70,000	$120,000	$415,000
	Salary (A):	$10,000	$10,000	$25,000	$38,000	$40,000	$123,000
	Salary (B):	$40,000	$40,000	100,000	32,000	80,000	$292,000

W-27-GF-05 Game Facilities Construction: Kauai County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Cattle guards, gates, fencing	3/yr @ Kekaha GMA					
2	Construct hunter campsites w/ composting toliet		1 year @ Waiahulu	1 year @ Na PAli Coast	1Year @ Na Pali Coast State Park	Finish any uncompleted	
3	Exclosure fence construction to protect T&E species	As needed / botanical	As needed / botanical	As needed / botanical		As needed / botanical	
4	Sign and marker replacement	80/yr	80/yr	80/yr	80/yr	80/yr	
5	Complete water tank/catchment line	. 1/yr					
	Total Cost / Year	$50,000	$50,000	$43,750	$43,750	$100,000	$231,250
	Salary (A):	$10,000	$10,000	$8,750	$22,000	$30,000	$46,250
	Salary (B):	$40,000	$40,000	#5,000	$21,000	$70,000	$185,000

W-28-GS-05 Game Surveys and Inventories (Game Mammal): Kauai County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Aerial Goat Census	1 x / yr	1 x / yr	1 x / yr	1 x / yr	1 x / yr	
2	B.T. Deer Browse Survey	1 x / yr	1 x / yr	1 x / yr	1 x / yr	1 x / yr	
3	Game Exclosure Analysis	1 x / yr	1 x / yr	1 x / yr	1 x / yr	1 x / yr	
4	Feral Pig Surveys	1 x / yr	1 x / yr	1 x / yr	1 x / yr	1 x / yr	
5	Check Station Record Collection	2 x / mo.	2 x / mo.	2 x / mo.	2 x / mo.	2 x / mo.	
6	Deer Check Stn. Attendant t	Sept. Dec Weekends	Sept. Dec Weekends	Sept. Dec Weekends	Sept. Dec Weekends	Sept. Dec Weekends	
7	Analysis Hunter Checking Statin Results	1 x / yr.	1 x / yr.	1 x / yr.	1 x / yr.	1 x / yr.	
8	Analyze Data & Prepare Progress Report.	1 x / yr.	1 x / yr.	1 x / yr.	1 x / yr.	1 x / yr.	
	Total Cost / Year	$37,500	$37,500	$37,500	$35,000	$65,000	$212,500
	Salary (A):	$7,500	$7,500	$7,500	$7,500	$38,000	$68,000
	Salary (B):	$30,000	$30,000	$30,000	$30,000	$27,000	$147,000

W-28-GS-05: Game Bird Surveys and Inventories (Game Bird): Kauai County							
		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Planned Activities	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	Activity Frequency	
1	Check Station Record Collection 6 stations	Nov. – Jan. Weekly	Nov. – Jan. Weekly	Nov. – Jan. Weekly	Nov. – Jan. Weekly	Nov. – Jan. Weekly	
2	Pre-season Survey	2 x/yr.	2 x/yr.	2 x/yr.	2 x/yr.	2 x/yr.	
3	Game Bird Disease/Prod Survey	Year-round	Year-round	Year-round	Year-round	Year-round	
4	Analyze Data and Prepare Annual Report	1 x / yr	1 x / yr	1 x / yr	1 x / yr	1 x / yr	
	Total Cost / Year	$25,000	$25,000	$25,000	$25,000	$30,000	$130,000
	Salary (A):	$5,000	$5,000	$5,000	$5,000	$10,000	$30,000
	Salary (B):	$20,000	$20,000	$20,000	$20,000	$20,000	$100,000

Kauai County Total

		FY12	FY13	FY14	FY15	FY16	5- yr Total
	Total Cost / Year	$306,250	$212,500	$487,500	$400,000	$517,500	$1,855,000
1	Salary (A):	$61,250	$42,500	$97,500	$66,250	$159,500	$427,000
2	Salary (B):	$245,000	$170,000	$390,000	$265,000	$358,000	$1,428,000

Appendices

I. DOFAW Game Management Guidelines

To formulate and use a consistent philosophy for game management priorities and actions by DOFAW, and to make those known to agency personnel, partners, and the general public, the Division has developed a set of working guidelines for game management policy on DOFAW managed lands. The guidelines recognize and prioritize the importance and sustainability of native ecosystems. They are intended to provide administrative policy direction and prioritize resource management activities based on the integrity of existing natural resources. The guidelines were developed through meetings held with the public, cooperating agencies, and researchers and provide a mechanism for public and agency interaction that improves the understanding of our management programs by the community, other agencies and policy makers. The basis of DOFAW's Resource Management Guidelines is the status of the native vegetation in an area. The character of the vegetation is classified as: "Most Pristine Native", "Predominantly Native", "Considerably Disturbed", or "Badly Degraded or Highly Altered". The vegetation status is then considered in conjunction with public safety, public demand for specific resources, and the effect of the proposed use on the vegetation. Potential game management strategies have been divided into four categories, called Game Animal Management Classifications. These are:

Game Production. Game is a primary objective. Areas are managed for public hunting on a sustained yield basis. Habitat may be manipulated for the purpose of increasing or maintaining the game carrying capacity of the habitat. Hunting seasons and bag limits are set to provide sustained public hunting opportunities and benefits. Some of the GMA's are in this class.

Mixed Game and Other Uses. Production of game is an objective integrated with other uses such as hiking, production of forest products, and protection of native resources. Game populations are managed to acceptable levels using public hunting. Habitat manipulation for game enhancement may be conducted, but only when it is consistent with other uses. Seasons and bag limits are designed to ensure compatibility with other uses. These areas include portions of forest reserves and some GMA's.

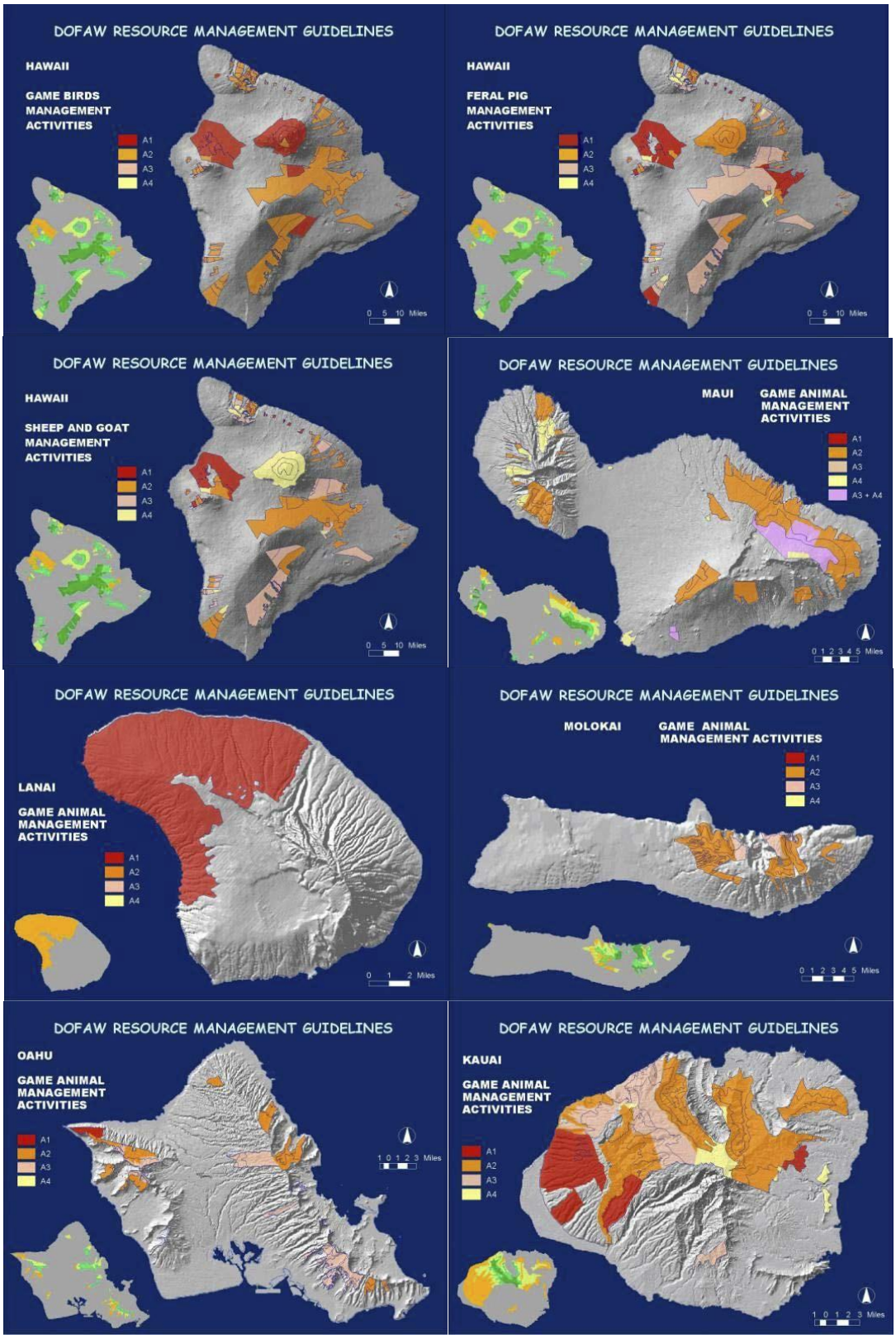
Game Control. Protection of resources is the primary objective, with emphasis on native plant community and watershed protection. Hunting is used to reduce animal impacts to those resources. Bag limits or seasons are liberal. These areas include watershed areas, portions of forest reserves, Natural Area Reserves, and wilderness preserves.

Staff Control. Areas designated for animal removal by staff or agency designees because of remoteness, environmental sensitivity, or public safety. Game mammal control is the objective. Control actions can include but are not limited to staff shooting or animal translocation.

These 79 areas include portions of forest reserves, Natural Area Reserves, wilderness reserves, and plant and wildlife sanctuaries. Under DOFAW's Resource Management Guidelines, maintaining game bird populations is considered compatible with other uses in most areas. Game birds are managed for "Game Production" or "Mixed Game and Other Uses" in most areas. Because of potential detrimental effects of game mammals on native ecosystems, management strategy for game mammals is more complex. Areas managed for game mammal production, i.e. "Game Production", are located primarily in areas classified as "Badly Degraded or Highly Altered". These areas have a preponderance of weedy species, contain very few native plants, and are managed to produce game animals for recreational hunting. Under this management approach, known individuals or populations of listed plants are fenced or otherwise protected from feral ungulates. Areas classified as "Predominantly Native" and "Considerably Disturbed" are managed as "Mixed Game and Other Uses" for game mammals and have seasons and bag limits designed to ensure compatibility with other uses, including native ecosystem protection. Areas classified as "Most Pristine Native" are managed for "Game Control or Staff Control" and have the most liberal hunting seasons to minimize the pressure of feral animals on native ecosystems.

The following maps provide guidelines for each island with management categories described as follow:

- A-1: Game Production Game is a primary objective in these areas. Hunting seasons and bag limits provide maximal sustained public hunting opportunities and benefits. Areas include Game Management Areas.
- A-2: Mixed Game and Other Uses In these areas game management is an objective integrated with other uses. Habitat may be manipulated for game enhancement. Game populations are managed to acceptable levels using public hunting.
  A-3: Game Control (public) In these areas resource protection is the primary objective, with emphasis on native plant communities and watersheds. Seasons and bag limits are designed for public hunting to reduce impacts to native resources.
- A-4: Game Control (supervised) These areas are designated for animal removal by staff or agency designees because of environmental sensitivity, remoteness, or public


DOFAW RESOURCE MANAGEMENT GUIDELINES
HAWAII
GAME BIRDS MANAGEMENT ACTIVITIES
A1
A2
A3
A4
0 5 10 Miles
DOFAW RESOURCE MANAGEMENT GUIDELINES
HAWAII
FERAL PIG MANAGEMENT ACTIVITIES
A1
A2
A3
A4
0 5 10 Miles
DOFAW RESOURCE MANAGEMENT GUIDELINES
HAWAII
SHEEP AND GOAT MANAGEMENT ACTIVITIES
A1
A2
A3
A4
0 5 10 Miles
DOFAW RESOURCE MANAGEMENT GUIDELINES
MAUI
GAME ANIMAL MANAGEMENT ACTIVITIES
A1
A2
A3
A4
A3 + A4
0 1 2 3 4 5 Miles
DOFAW RESOURCE MANAGEMENT GUIDELINES
LANAI
GAME ANIMAL MANAGEMENT ACTIVITIES
A1
A2
A3
A4
0 1 2 Miles
DOFAW RESOURCE MANAGEMENT GUIDELINES
MOLOKAI
GAME ANIMAL MANAGEMENT ACTIVITIES
A1
A2
A3
A4
0 1 2 3 4 5 Miles
DOFAW RESOURCE MANAGEMENT GUIDELINES
OAHU
GAME ANIMAL MANAGEMENT ACTIVITIES
A1
A2
A3
A4
1 0 1 2 3 Miles
DOFAW RESOURCE MANAGEMENT GUIDELINES
KAUAI
GAME ANIMAL MANAGEMENT ACTIVITIES
A1
A2
A3
A4
1 0 1 2 3 Miles

II. Animal and Plant Species Listed in Hawaii and that occur in this state

E Akekee (*Loxops caeruleirostris*)

E Akepa, Hawaii (honeycreeper) (*Loxops coccineus coccineus*)
E Akepa, Maui (honeycreeper) (*Loxops coccineus ochraceus*)
E Akialoa, Kauai (honeycreeper) (*Hemignathus procerus*)
E Akiapola`au (honeycreeper) (*Hemignathus munroi*)
E Akikiki (*Oreomystis bairdi*)
E Albatross, short-tailed (*Phoebastria (=Diomedea) albatrus*)
E Amphipod, Kauai cave (*Spelaeorchestia koloana*)
E Bat, Hawaiian hoary (*Lasiurus cinereus semotus*)
E Coot, Hawaiian (*Fulica americana alai*)
E Creeper, Hawaii (*Oreomystis mana*)
E Creeper, Molokai (*Paroreomyza flammea*)
E Creeper, Oahu (*Paroreomyza maculata*)
E Crow, Hawaiian (='alala) (*Corvus hawaiiensis*)
E Damselfly, flying earwig Hawaiian (*Megalagrion nesiotes*)
E Damselfly, Pacific Hawaiian (*Megalagrion pacificum*)
E Duck, Hawaiian (=koloa) (*Anas wyvilliana*)
E Duck, Laysan (*Anas laysanensis*)
E Elepaio, Oahu (*Chasiempis sandwichensis ibidis*)
E Finch, Laysan (honeycreeper) (*Telespyza cantans*)
E Finch, Nihoa (honeycreeper) (*Telespyza ultima*)
E Fly, Hawaiian picture-wing (*Drosophila sharpi*)
E Goose, Hawaiian (*Branta (=Nesochen) sandvicensis*)
E Hawk, Hawaiian (='lo) (*Buteo solitarius*)
E Honeycreeper, crested (*Palmeria dolei*)
E Millerbird, Nihoa (old world warbler) (*Acrocephalus familiaris kingi*)
E Moorhen, Hawaiian common (*Gallinula chloropus sandvicensis*)
E Moth, Blackburn's sphinx (*Manduca blackburni*)
E Nukupu`u (honeycreeper) (*Hemignathus lucidus*)
E Palila (honeycreeper) (*Loxioides bailleui*)
E Parrotbill, Maui (honeycreeper) (*Pseudonestor xanthophrys*)
E Petrel, Hawaiian dark-rumped (*Pterodroma phaeopygia sandwichensis*)
E Pomace fly, [unnamed] (*Drosophila aglaia*)
E Pomace fly, [unnamed] (*Drosophila differens*)
E Pomace fly, [unnamed] (*Drosophila hemipeza*)
E Pomace fly, [unnamed] (*Drosophila heteroneura*)
E Pomace fly, [unnamed] (*Drosophila montgomeryi*)
T Pomace fly, [unnamed] (*Drosophila mulli*)
E Pomace fly, [unnamed] (*Drosophila musaphila*)
E Pomace fly, [unnamed] (*Drosophila neoclavisetae*)
E Pomace fly, [unnamed] (*Drosophila obatai*)
E Pomace fly, [unnamed] (*Drosophila ochrobasis*)
E Pomace fly, [unnamed] (*Drosophila substenoptera*)
E Pomace fly, [unnamed] (*Drosophila tarphytrichia*)
E Po`ouli (honeycreeper) (*Melamprosops phaeosoma*)

T	Sea turtle, green except where endangered (*Chelonia mydas*)
E	Sea turtle, hawksbill (*Eretmochelys imbricata*)
E	Sea turtle, leatherback (*Dermochelys coriacea*)
T	Sea turtle, loggerhead (*Caretta caretta*)
E	Seal, Hawaiian monk (*Monachus schauinslandi*)
T	Shearwater, Newell's Townsend's (*Puffinus auricularis newelli*)
T	Snail, Newcomb's (*Erinna newcombi*)
E	Snails, Oahu tree (*Achatinella spp.*)
E	Spider, Kauai cave wolf or pe'e pe'e maka 'ole (*Adelocosa anops*)
E	Stilt, Hawaiian (*Himantopus mexicanus knudseni*)
E	Thrush, large Kauai (=kamao) (*Myadestes myadestinus*)
E	Thrush, Molokai (*Myadestes lanaiensis rutha*)
E	Thrush, small Kauai (=puaiohi) (*Myadestes palmeri*)
E	Whale, humpback (*Megaptera novaeangliae*)
E	`O`o, Kauai (honeyeater) (*Moho braccatus*)
E	`O`u (honeycreeper) (*Psittirostra psittacea*)

Animal listed species occurring in this state that are not listed in this state

Status	Species
E	Pigtoe, Georgia (*Pleurobema hanleyianum*)
T	Sea turtle, olive ridley except where endangered (*Lepidochelys olivacea*)

Summary of Plant listings

Plant species listed in Hawaii and that occur in this state (319 species)

Status	Species
E	Alani (*Melicope adscendens*)
E	Alani (*Melicope balloui*)
E	Alani (*Melicope degeneri*)
E	Alani (*Melicope haupuensis*)
E	Alani (*Melicope knudsenii*)
E	Alani (*Melicope lydgatei*)
E	Alani (*Melicope mucronulata*)
E	Alani (*Melicope munroi*)
E	Alani (*Melicope ovalis*)
E	Alani (*Melicope pallida*)
E	Alani (*Melicope paniculata*)
E	Alani (*Melicope puberula*)
E	Alani (*Melicope quadrangularis*)
E	Alani (*Melicope reflexa*)
E	Alani (*Melicope saint-johnii*)
E	Alani (*Melicope zahlbruckneri*)
E	aumakua, Palapalai (*Dryopteris crinalis var. podosorus*)
E	Aupaka (*Isodendrion hosakae*)
E	Aupaka (*Isodendrion laurifolium*)
T	Aupaka (*Isodendrion longifolium*)
E	Awiwi (*Centaurium sebaeoides*)
E	Awiwi (*Hedyotis cookiana*)
E	A`e (*Zanthoxylum dipetalum var. tomentosum*)
E	A`e (*Zanthoxylum hawaiiense*)

E Bluegrass, Hawaiian (*Poa sandvicensis*)
E Bluegrass, Mann's (*Poa mannii*)
E Chaff-flower, round-leaved (*Achyranthes splendens var. rotundata*)
E Diellia, asplenium-leaved (*Diellia erecta*)
E Fern, pendant kihi (*Adenophorus periens*)
E Gardenia (=Na`u), Hawaiian (*Gardenia brighamii*)
E Geranium, Hawaiian red-flowered (*Geranium arboreum*)
E Haha (*Cyanea acuminata*)
E Haha (*Cyanea asarifolia*)
E Haha (*Cyanea copelandii ssp. copelandii*)
E Haha (*Cyanea copelandii ssp. haleakalaensis*)
E Haha (*Cyanea dolichopoda*)
E Haha (*Cyanea dunbarii*)
E Haha (*Cyanea eleeleensis*)
E Haha (*Cyanea glabra*)
E Haha (*Cyanea grimesiana ssp. grimesiana*)
E Haha (*Cyanea grimesiana ssp. obatae*)
E Haha (*Cyanea hamatiflora ssp. carlsonii*)
E Haha (*Cyanea hamatiflora ssp. hamatiflora*)
E Haha (*Cyanea humboldtiana*)
E Haha (*Cyanea kolekoleensis*)
E Haha (*Cyanea koolauensis*)
E Haha (*Cyanea kuhihewa*)
E Haha (*Cyanea lobata*)
E Haha (*Cyanea longiflora*)
E Haha (*Cyanea macrostegia ssp. gibsonii*)
E Haha (*Cyanea mannii*)
E Haha (*Cyanea mceldowneyi*)
E Haha (*Cyanea pinnatifida*)
E Haha (*Cyanea platyphylla*)
E Haha (*Cyanea procera*)
T Haha (*Cyanea recta*)
E Haha (*Cyanea remyi*)
E Haha (*Cyanea shipmanii*)
E Haha (*Cyanea st.-johnii*)
E Haha (*Cyanea stictophylla*)
E Haha (*Cyanea superba*)
E Haha (*Cyanea truncata*)
E Haha (*Cyanea undulata*)
E Haiwale (*Cyrtandra paliku*)
E Hala pepe (*Pleomele hawaiiensis*)
E Hau kuahiwi (*Hibiscadelphus giffardianus*)
E Hau kuahiwi (*Hibiscadelphus hualalaiensis*)
E Hau kuahiwi (*Hibiscadelphus woodii*)
E Ha`iwale (*Cyrtandra crenata*)
E Ha`iwale (*Cyrtandra dentata*)
E Ha`iwale (*Cyrtandra giffardii*)
T Ha`iwale (*Cyrtandra limahuliensis*)
E Ha`iwale (*Cyrtandra munroi*)

E Ha`iwale (*Cyrtandra oenobarba*)
E Ha`iwale (*Cyrtandra polyantha*)
E Ha`iwale (*Cyrtandra subumbellata*)
E Ha`iwale (*Cyrtandra tintinnabula*)
E Ha`iwale (*Cyrtandra viridiflora*)
E Heau (*Exocarpos luteolus*)
E Hedyotis, Na Pali beach (*Hedyotis st.-johnii*)
E Hibiscus, Clay's (*Hibiscus clayi*)
E Holei (*Ochrosia kilaueaensis*)
E Honohono (*Haplostachys haplostachya*)
E Ho`awa (*Pittosporum napaliense*)
E Ihi`ihi (*Marsilea villosa*)
E Iliau, dwarf (*Wilkesia hobdyi*)
E Ischaemum, Hilo (*Ischaemum byrone*)
E Kamakahala (*Labordia cyrtandrae*)
E Kamakahala (*Labordia helleri*)
E Kamakahala (*Labordia lydgatei*)
E Kamakahala (*Labordia pumila*)
E Kamakahala (*Labordia tinifolia var. lanaiensis*)
E Kamakahala (*Labordia tinifolia var. wahiawaensis*)
E Kamakahala (*Labordia triflora*)
E Kamanomano (*Cenchrus agrimonioides*)
E Kauai hau kuahiwi (*Hibiscadelphus distans*)
E Kauila (*Colubrina oppositifolia*)
E Kaulu (*Pteralyxia kauaiensis*)
E Kio`ele (*Hedyotis coriacea*)
E Kiponapona (*Phyllostegia racemosa*)
E Kohe malama malama o kanaloa (*Kanaloa kahoolawensis*)
E Koki`o (*Kokia drynarioides*)
E Koki`o (*Kokia kauaiensis*)
E Koki`o ke`oke`o (*Hibiscus arnottianus ssp. immaculatus*)
E Koki`o ke`oke`o (*Hibiscus waimeae ssp. hannerae*)
E Koki`o, Cooke's (*Kokia cookei*)
E Kolea (*Myrsine juddii*)
E Kolea (*Myrsine knudsenii*)
T Kolea (*Myrsine linearifolia*)
E Kolea (*Myrsine mezii*)
E Kopa (*Hedyotis schlechtendahliana var. remyi*)
E Kopiko (*Psychotria grandiflora*)E Kopiko (*Psychotria hobdyi*)
E Ko`oko`olau (*Bidens micrantha ssp. kalealaha*)
E Ko`oko`olau (*Bidens wiebkei*)
E Ko`oloa`ula (*Abutilon menziesii*)
E Kuahiwi laukahi (*Plantago hawaiensis*)
E Kuahiwi laukahi (*Plantago princeps*)
E Kuawawaenohu (*Alsinidendron lychnoides*)
E Kula wahine noho (*Isodendrion pyrifolium*)
E Kulu`i (*Nototrichium humile*)
E Lau `ehu (*Panicum niihauense*)
E Laulihilihi (*Schiedea stellarioides*)

E lehua makanoe (*Lysimachia daphnoides*)
E Liliwai (*Acaena exigua*)
E Love grass, Fosberg's (*Eragrostis fosbergii*)
E Lo`ulu (*Pritchardia affinis*)
E Lo`ulu (*Pritchardia kaalae*)
E Lo`ulu (*Pritchardia munroi*)
E Lo`ulu (*Pritchardia napaliensis*)
E Lo`ulu (*Pritchardia remota*)
E Lo`ulu (*Pritchardia schattaueri*)
E Lo`ulu (*Pritchardia viscosa*)
E Lo`ulu, (=Na`ena`e) (*Pritchardia hardyi*)
E Mahoe (*Alectryon macrococcus*)
T Makou (*Peucedanum sandwicense*)
E Mapele (*Cyrtandra cyaneoides*)
E Ma`o hau hele, (=native yellow hibiscus) (*Hibiscus brackenridgei*)
E Ma`oli`oli (*Schiedea apokremnos*)
E Ma`oli`oli (*Schiedea kealiae*)
E Mehamehame (*Flueggea neowawraea*)
E Naenae (*Dubautia kalalauensis*)
E Naenae (*Dubautia kenwoodii*)
E Nani wai`ale`ale (*Viola kauaiensis var. wahiawaensis*)
E Nanu (*Gardenia mannii*)
E Naupaka, dwarf (*Scaevola coriacea*)
E Na`ena`e (*Dubautia herbstobatae*)
E Na`ena`e (*Dubautia imbricata imbricata*)
E Na`ena`e (*Dubautia latifolia*)
E Na`ena`e (*Dubautia pauciflorula*)
E Na`ena`e (*Dubautia plantaginea magnifolia*)
E Na`ena`e (*Dubautia plantaginea ssp. humilis*)
E Na`ena`e (*Dubautia waialealae*)
E Nehe (*Lipochaeta fauriei*)
E Nehe (*Lipochaeta kamolensis*)
E Nehe (*Lipochaeta lobata var. leptophylla*)'
E Nehe (*Lipochaeta micrantha*)
E Nehe (*Lipochaeta tenuifolia*)
E Nehe (*Lipochaeta waimeaensis*)
E Nioi (*Eugenia koolauensis*)
E *Abutilon eremitopetalum* (No common name)
E *Abutilon sandwicense* (No common name)
E *Achyranthes mutica* (No common name)
E *Alsinidendron obovatum* (No common name)
E *Alsinidendron trinerve* (No common name)
E *Alsinidendron viscosum* (No common name)
E *Amaranthus brownii* (No common name)
E *Asplenium fragile var. insulare* (No common name)
E *Bonamia menziesii* (No common name)
E *Chamaesyce halemanui* (No common name)
E *Cyanea (=Rollandia) crispa* (No common name)
E *Delissea rhytidosperma* (No common name)

E *Delissea undulata* (No common name)
E *Diellia falcata* (No common name)
E *Diellia mannii* (No common name)
E *Diellia pallida* (No common name)
E *Diellia unisora* (No common name)
E *Diplazium molokaiense* (No common name)
E *Doryopteris angelica* (No common name)
E *Gahnia lanaiensis* (No common name)
E *Gouania hillebrandii* (No common name)
E *Gouania meyenii* (No common name)
E *Gouania vitifolia* (No common name)
E *Hedyotis degeneri* (No common name)
E *Hedyotis parvula* (No common name)
E *Hesperomannia arborescens* (No common name)
E *Hesperomannia arbuscula* (No common name)
E *Hesperomannia lydgatei* (No common name)
E *Keysseria (=Lagenifera) erici* (No common name)
E *Keysseria (=Lagenifera) helenae* (No common name)
E *Lipochaeta venosa* (No common name)
E *Lobelia gaudichaudii ssp. koolauensis* (No common name)
E *Lobelia monostachya* (No common name)
E *Lobelia niihauensis* (No common name)
E *Lobelia oahuensis* (No common name)
E *Lysimachia filifolia* (No common name)
E *Lysimachia iniki* (No common name)
E *Lysimachia lydgatei* (No common name)
E *Lysimachia maxima* (No common name)
E *Lysimachia pendens* (No common name)
E *Lysimachia scopulensis* (No common name)
E *Lysimachia venosa* (No common name)
E *Mariscus fauriei* (No common name)
E *Mariscus pennatiformis* (No common name)
E *Munroidendron racemosum* (No common name)
E *Neraudia angulata* (No common name)
E *Neraudia ovata* (No common name)
E *Neraudia sericea* (No common name)
E *Phyllostegia glabra var. lanaiensis* (No common name)
E *Phyllostegia hirsuta* (No common name)
E *Phyllostegia hispida* (No common name
E *Phyllostegia kaalaensis* (No common name)
E *Phyllostegia knudsenii* (No common name)
E *Phyllostegia mannii* (No common name)
E *Phyllostegia mollis* (No common name)
E *Phyllostegia parviflora* (No common name)
E *Phyllostegia renovans* (No common name)
E *Phyllostegia velutina* (No common name)
E *Phyllostegia waimeae* (No common name)
E *Phyllostegia warshaueri* (No common name)
E *Phyllostegia wawrana* (No common name)

E *Platanthera holochila* (No common name)
E *Poa siphonoglossa* (No common name)
E *Pteris lidgatei* (No common name)
E *Remya kauaiensis* (No common name)
E *Remya montgomeryi* (No common name)
E *Sanicula mariversa* (No common name)
E *Sanicula purpurea* (No common name)
E *Schiedea attenuata* (No common name)
E *Schiedea haleakalensis* (No common name)
E *Schiedea helleri* (No common name)
E *Schiedea hookeri* (No common name)
E *Schiedea kaalae* (No common name)
E *Schiedea kauaiensis* (No common name)
E *Schiedea lydgatei* (No common name)
E *Schiedea membranacea* (No common name)
E *Schiedea nuttallii* (No common name)
E *Schiedea sarmentosa* (No common name)
E *Schiedea spergulina var. leiopoda* (No common name)
T *Schiedea spergulina var. spergulina* (No common name)
E *Schiedea verticillata* (No common name)
E *Silene alexandri* (No common name)
T *Silene hawaiiensis* (No common name)
E *Silene lanceolata* (No common name)
E *Silene perlmanii* (No common name)
E *Spermolepis hawaiiensis* (No common name)
E *Stenogyne angustifolia var. angustifolia* (No common name)
E *Stenogyne bifida* (No common name)
E *Stenogyne campanulata* (No common name)
E *Stenogyne kanehoana* (No common name)
E *Stenogyne kealiae* (No common name)
E *Tetramolopium arenarium* (No common name)
E *Tetramolopium filiforme* (No common name)
E *Tetramolopium lepidotum ssp. lepidotum* (No common name)
E *Tetramolopium remyi* (No common name)
T *Tetramolopium rockii* (No common name)
E *Tetraplasandra bisattenuata* (No common name)
E *Tetraplasandra flynnii* (No common name)
E *Trematolobelia singularis* (No common name)
E *Vigna o-wahuensis* (No common name)
E *Viola helenae* (No common name)
E *Viola lanaiensis* (No common name)
E *Viola oahuensis* (No common name)
E *Xylosma crenatum* (No common name)
E Nohoanu (*Geranium kauaiense*)
E Nohoanu (*Geranium multiflorum*)
E Oha (*Delissea rivularis*)
E Oha (*Delissea subcordata*)
E Ohai (*Sesbania tomentosa*)
E Olulu (*Brighamia insignis*)

E Opuhe (*Urera kaalae*)
E Pamakani (*Tetramolopium capillare*)
E Pamakani (*Viola chamissoniana ssp. chamissoniana*)
E Panicgrass, Carter's (*Panicum fauriei var. carteri*)
E Papala (*Charpentiera densiflora*)
E Pauoa (*Ctenitis squamigera*)
E Pa`iniu (*Astelia waialealae*)
E Pilo (*Hedyotis mannii*)
E Pilo kea lau li`i (*Platydesma rostrata*)
E Popolo ku mai (*Solanum incompletum*)
E Po`e (*Portulaca sclerocarpa*)
E Pua `ala (*Brighamia rockii*)
E Pu`uka`a (*Cyperus trachysanthos*)
E Remya, Maui (*Remya mauiensis*)
E Sandalwood, Lanai (=`iliahi) (*Santalum freycinetianum var. lanaiense*)
E Schiedea, Diamond Head (*Schiedea adamantis*)
E Silversword, Mauna Loa (=Ka'u) (*Argyroxiphium kauense*)
E Uhiuhi (*Caesalpinia kavaiense*)
E Vetch, Hawaiian (*Vicia menziesii*)
E Wahane (*Pritchardia aylmer-robinsonii*)
E Wawae`iole (*Huperzia mannii*)
E Wawae`iole (*Lycopodium (=Phlegmariurus) nutans*)
T `Ahinahina (*Argyroxiphium sandwicense ssp. macrocephalum*)
E `Ahinahina (*Argyroxiphium sandwicense ssp. sandwicense*)
E `Aiakeakua, popolo (*Solanum sandwicense*)
E `Aiea (*Nothocestrum breviflorum*)
E `Aiea (*Nothocestrum peltatum*)
E `Akoko (*Chamaesyce celastroides var. kaenana*)
E `Akoko (*Chamaesyce deppeana*)
E `Akoko (*Chamaesyce eleanoriae*)
E `Akoko (*Chamaesyce herbstii*)
E `Akoko (*Chamaesyce kuwaleana*)
E `Akoko (*Chamaesyce remyi var. kauaiensis*)
E `Akoko (*Chamaesyce remyi var. remyi*)
E `Akoko (*Chamaesyce rockii*)
E `Akoko (*Euphorbia haeleeleana*)
E `Akoko, Ewa Plains (*Chamaesyce skottsbergii var. kalaeloana*)
E `Anaunau (*Lepidium arbuscula*)
E `Anunu (*Sicyos alba*)
E `Awikiwiki (*Canavalia molokaiensis*)
E `Awikiwiki (*Canavalia napaliensis*)
E `Oha wai (*Clermontia drepanomorpha*)
E `Oha wai (*Clermontia lindseyana*)
E `Oha wai (*Clermontia oblongifolia ssp. brevipes*)
E `Oha wai (*Clermontia oblongifolia ssp. mauiensis*)
E `Oha wai (*Clermontia peleana*)
E `Oha wai (*Clermontia pyrularia*)
E `Oha wai (*Clermontia samuelii*)
E `Ohe`ohe (*Tetraplasandra gymnocarpa*)